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**REPORT ON MATERNAL MORTALITY AND MORBIDITY
IN THE STATE OF VICTORIA.**

By ROBERT MARSHALL ALLAN, M.C., M.D., F.R.C.S.E.,
F.C.S.A.

THE subject of better protection of the lives and health of mothers during childbirth has aroused considerable public interest within recent years, especially in English-speaking countries. There has been a gradual realization that much of the mortality and subsequent sickness is preventable and that the health of the mother exercises a far-reaching influence on infantile mortality.

It is to the credit of the medical profession in Victoria that persistent efforts have been made by them during the last ten years to raise the standards of obstetric practice in the State. When the Melbourne Permanent Post-Graduate Committee was formed in 1920, obstetrics was given a prominent place in its activities. Post-graduate classes and lectures were arranged not only in Melbourne, but also at country centres, while the Women's Hospital was the first Australian obstetric hospital to hold an annual residential post-graduate course. In 1924 the Victorian Branch of the British Medical Association appointed an Obstetric Inquiry Committee which later published an important report. This was followed by an essay competition. In 1925, by reason of the generosity of the Edward Wilson (*The Argus*) Trust, a Director of Obstetrical Research was appointed to inquire into the causes of maternal mortality and morbidity in Victoria with instructions to suggest means to prevent or lessen the same. In 1926 the Federal Royal Commission on Health made the following recommendations regarding maternity hygiene:

1. The establishment of a division of maternity hygiene in the Federal Department of Health.
2. Conditional subsidies to States to provide facilities for attention to women before, during and after childbirth.
3. Amendment of the *Maternity Allowance Act*—
 - (a) To provide that application for the allowance should be made at least five months before child-birth. No payment to be made unless a medical certificate be produced showing that the mother has had antenatal supervision;
 - (b) No child to be deemed viable which measures less than 14 inches in length.
4. Conditional subsidies to assist in the education of medical students and nurses in obstetrics.
5. The encouragement and development of research.

From this survey of the work already done in the State it will be seen that the medical profession, fully alive to the importance of the subject, has therefore been in the forefront of the endeavours being made to meet the situation.

Scope of the Investigation.

The first step taken in this investigation has been an attempt to secure accurate and complete statistical information regarding the extent of the problem in Victoria. It was also considered essential to obtain first hand knowledge of the manner in which the maternity services of the State were working. This involved personal interviews with a large proportion of those medical practitioners engaged in the work, as well as an inspection of all hospitals licensed to admit obstetric patients. In addition, attempts were made to investigate various problems concerned with puerperal sepsis and the toxæmias of pregnancy. This was done by the collaboration of specialists attached to the Women's and Queen Victoria Hospitals and expert research workers from the Walter and Eliza Hall Research Institute and the Bio-chemical Department of the University.

The final results of this threefold investigation into statistics, the practice of obstetrics together with clinical and laboratory work are now presented. Although many questions have remained unanswered owing to lack of time as well as necessary data, the evidence available is sufficient to warrant conclusions of practical importance.

PART I.—STATISTICAL INVESTIGATIONS.

For the purposes of this report the statistics dealing with Victorian results have been compiled from the State returns. In some cases the official figures have been subjected to close scrutiny and alterations made where it was clear that causes of death had been entered under incorrect headings. The Commonwealth figures have been used for all inter-State and international comparisons.

Fallacies and Possible Omissions in Statistics of Puerperal Mortality.

In no State of the Commonwealth is it obligatory to note on the death certificate whether pregnancy or labour had occurred within a reasonable period of the death or was definitely associated with the cause of death. In addition, varying interpretations have been placed on certificates showing more than one cause of death. There has been a tendency to classify deaths as non-puerperal wherever possible or to under-estimate the number of deaths due to puerperal sepsis and thus give an erroneous value to the puerperal death rate. However, close co-operation between Federal and State statisticians during recent years has resulted in records as accurate as it is possible to make them.

Faulty Certification.

The number of deaths due to puerperal causes is probably under-estimated owing to faulty certification. A detailed inspection of the death certificates for the past ten years shows that in some cases no real cause is given or else the cause is stated in vague terms which preclude correct classification, for example: severe parturition, paralysis, collapse, chronic peritonitis, general chill of pregnancy, pregnancy jaundice, pio-hydro marasmus.

Some certificates give the impression that either the medical practitioner has not diagnosed the cause of death correctly or more likely that he is unwilling to certify to the true cause, for example: myocarditis, encephalitis, pneumonia, influenza. This applies particularly to cases of puerperal septicæmia and is due mainly to the unreasonable attitude of the general public, who invariably blame the medical attendant for all such deaths.

It is clearly evident that the Victorian Statistician is hampered first by the use of a careless nomenclature by some doctors and secondly to a greater extent by his inability to refer any dubious certificates to the medical practitioner for fuller details. In Great Britain, for example, in 1925 the Registrar-General issued 8,800 queries and received 7,900 replies regarding doubtful certificates. This enabled the records to be clarified to a marked degree.

Estimates of Omissions due to Faulty Certification.

The Statistician makes use of the register of births to note whether childbirth might be regarded as a complication of death in all females between fifteen and fifty. Many cases are added to the puerperal list which might have been otherwise omitted. This method is inapplicable, however, to cases where death occurs during pregnancy without the birth of a child.

A small number of deaths in women during the child-bearing period are classified as due to ill-defined or unknown causes. If these had been properly certified, there is no doubt that the puerperal group would have received its share. Between 1920 and 1926 the deaths of women between fifteen and fifty from these causes was 90. On a conservative estimate that the proportion due to puerperal deaths was equal to the percentage of puerperal to total deaths from known causes, ten would have to be added to the puerperal mortality. This represents an increase of 9% of the puerperal deaths for this period.

The possible omission of puerperal deaths may also be inferred from the sex distribution of deaths from causes to which such transfers may be made. If any considerable number of puerperal deaths were certified as due to conditions such as peritonitis, nephritis, appendicitis or pneumonia, such a transfer would result in an undue preponderance of female deaths during the child-bearing period.

TABLE I.—RELATIVE MORTALITY, MALES AND FEMALES, BY AGE GROUPS, 1922-1926.

Ages.	Deaths from								
	Peritonitis.			Acute Nephritis.			Chronic Nephritis.		
	Males.	Females.	Ratio. ¹	Males.	Females.	Ratio.	Males.	Females.	Ratio.
All ages	97	125	129	152	152	100	2,073	1,754	85
0-15	25	25	100	43	33	77	23	14	61
15-49	25	65	200	63	86	136	334	407	122
50 and over	47	35	74	46	33	72	1,716	1,333	78

¹ Females to one hundred males.

Comparison of the number of deaths from such diseases of males and females at different ages would show whether this transference could have occurred.

This comparison of the relative number of male and female deaths in age groups shows a marked excess of female deaths during the child-bearing period. At ages 15 to 49 the number of female deaths from peritonitis was more than twice that among males, under fifteen the numbers were equal and over fifty the male deaths predominated. For acute and chronic nephritis the ratio of female to male deaths was practically identical for ages under fifteen and over fifty, but showed a marked increase for the child-bearing age. No such changes were noted with appendicitis and pneumonia which are sometimes considered to be terms used to conceal cases of puerperal septicæmia. Although there are grounds for assuming that transfers have been made, it is difficult to estimate this factor. The increase in female deaths from peritonitis, for example, may be due to gynaecological operations. In any case the calculation is inapplicable to those diseases peculiar to the female sex to which transfers from puerperal causes might well have been made. Puerperal deaths may be incorrectly reported and classified as due to salpingitis. During the period under review 66 such deaths were noted, but no definite conclusions can be drawn from this figure.

Summary.

Improvement in statistical returns cannot be expected until (i) the association of pregnancy or child-birth with a maternal death is stated on the death certificate (this should apply to all deaths within three months of abortion, miscarriage or child-birth); (ii) power is granted to the Statistician to refer dubious certificates to the medical practitioner for fuller details (it would be of material assistance if more definite instructions and information regarding the correct classification of the causes of death were printed on the cover of the official book of death certificates); (iii) the present system of open certification is supplemented by confidential notification of the cause of death; (iv) all puerperal deaths are investigated by a special board of inquiry. This should consist of a representative of the Health Department, the professor or lecturer in obstetrics and a senior obstetrician. In addition to statistical information, much valuable clinical data would be obtained for the information and guidance of those engaged in obstetrical practice.

The Primary Causes of Puerperal Mortality.

The International List of Causes of Death classifies puerperal deaths under the following groups:

1. Accidents of pregnancy. This includes abortion (if not criminal), miscarriage, ectopic pregnancy and *hyperemesis gravidarum*. Criminal abortion is entered in a separate non-puerperal group.

2. Puerperal haemorrhage including both *ante* and *post partum* haemorrhage.

3. Other accidents of labour which comprise difficult labour, malpresentations, Cæsarean section and other operative procedures.

4. Puerperal septicæmia. Septic abortions are included under this group.

5. Puerperal *phlegmasia alba dolens*, embolism, sudden death.

6. Puerperal albuminuria and convulsions.

7. Deaths following child-birth not otherwise defined. Puerperal insanity is included here.

8. Puerperal diseases of the breast.

The relative order of these primary causes of mortality is illustrated in Table II.

TABLE II.—PRIMARY CAUSES OF MATERNAL MORTALITY : VICTORIA, 1918-1927.

Causes of Death.	Number of Cases.	Percentage Total Mortality.	Mortality per 1,000 Births.
Puerperal sepsis	675	44	1.930
Puerperal albuminuria	281	18	0.803
Puerperal hemorrhage	188	12	0.537
Other accidents of labour	155	10	0.443
Ectopic pregnancy	70	4.5	0.200
Abortion	66	4.2	0.188
Other accidents of pregnancy	51	3.3	0.145
Puerperal phlegmasia, <i>et cetera</i>	48	3	0.137
Following child-birth	15	1	0.042
Puerperal diseases of breast	1	—	—
	1,550	100.0	4.425

Puerperal sepsis is, therefore, the most important single cause of death and is responsible for over two-fifths of the total deaths. In most discussions on statistics sepsis is referred to separately and the remainder of the groups are combined under the heading "other causes." Although albuminuria, haemorrhage and accidents of labour individually do not cause the loss of so many lives as sepsis, collectively they form an important factor in maternal mortality.

Contributory Causes of Puerperal Mortality.

Statistics showing the contributory causes of maternal mortality are not easily obtainable. The majority of death certificates give very scanty information on this subject.

TABLE III.—CONTRIBUTORY CAUSES OF PUERPERAL DEATHS : VICTORIA, 1920-1926.

Total puerperal deaths .. ..	..	..	1,113
With contributory causes .. ..	..	..	128 (11.5 %)
Organic heart disease .. ..	..	..	30
Nephritis, pyelo-nephritis .. ..	..	..	29
Pneumonia .. ..	..	..	17
Salpingitis .. ..	..	..	14
Anæmia, asthenia .. ..	..	..	14
Intestinal obstruction .. ..	..	..	9
Influenza .. ..	..	..	4
Appendicitis .. ..	..	..	4
Miscellaneous causes .. ..	..	..	7

It will be seen that heart affections, renal disease and pneumonia were responsible for 60% of the complications in the cases reported with contributory causes. Until notification is more complete, much useful information will not be obtainable.

Factors in Puerperal Mortality.

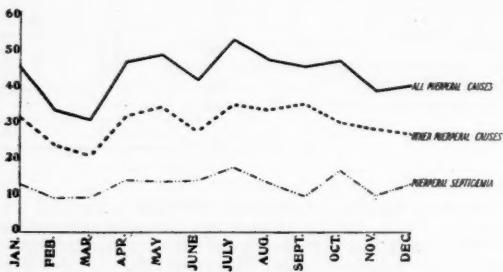
The risk of death from the specific causes mentioned in the preceding paragraphs varies with such circumstances as the period of pregnancy, whether it terminated with a live or still-born child, whether the labour was normal or complicated, whether any operative interference was necessary and also with such factors as the age of the mother or the interval between birth of the child and death of the mother. The quality of the medical and nursing services also plays an important part and will be dealt with later.

Abortion.

It is impossible to estimate accurately the prevalence of abortion and miscarriage. There are reasonable grounds for suspecting that many cases have been self-induced and that the incidence of abortion is on the increase, especially in the larger cities. Reference to Table II shows that abortion was the cause of death in 4·2% of the puerperal mortality during the past ten years. In addition one-third of the cases of puerperal sepsis were septic abortions. Many of these were undoubtedly the result of intentional interference. Deaths following such interference can hardly be classified as part of the risk to which all mothers are exposed, but in statistical returns they are included with abortions from natural causes and cannot be separated. Under the separate entry "homicide by other means" are

MATERNAL MORTALITY AVERAGE MONTHLY VARIATION VICTORIA 1920-26

PER 10000 BIRTHS



noted forty cases of death following criminal abortion; all these cases were classified after investigation by a coroner. For every woman who dies, many others recover, although damaged in health. A later pregnancy exposes this large section to increased risks from septic infection. The prevalence of induced abortion, especially among single women, is a social factor beyond the control of the medical profession. The risks both immediate and more remote following interruption of pregnancy at an early stage have not been appreciated by the general public. This mortality which is not decreasing, will prevent any marked reduction in the total puerperal death rate.

Ectopic Pregnancy.

The incidence of ectopic pregnancy remains constant both in urban and rural areas. Exception has been taken to the inclusion of such cases in estimating the maternal mortality rate. They cannot be prevented in the light of our present knowledge and constitute grave surgical emergencies. But inspection of the death certificates show that many women die, not from the effects of loss of blood, but from peritonitis following operation, an indication that the surgical technique was not faultless in some instances. There is room for improvement in this respect, even if it be granted that an emergency operation must often be performed in unsuitable surroundings.

Still-Births.

Western Australia is the only State in the Commonwealth in which the notification of still-births is required. At present it is impossible to obtain data, such as the mode of delivery, age of mother *et cetera*, to make comparisons with countries where such registration is enforced. However, as the maternity allowance is paid only on the certificate of a registrar of births and deaths, who must also issue a certificate for burial, it is probable that the majority are already notified, although without any details of causation.

The still-birth rate based on these returns has remained constant for some time and averages 30 per thousand live births.

It is regrettable that the maternity allowance returns do not give detailed information along these lines. As both the Federal Royal Commission on Health and the Conference of Australasian Statisticians in 1926 recommended the compulsory notification of still-births, it is to be hoped that this will be accepted by the various States in the immediate future.

The Age of the Mother.

The relation between the age of the mother and the mortality rate is given in Table IV.

TABLE IV.—DETAILED CAUSES OF DEATH BY AGE GROUPS:
VICTORIA, 1920-1926.

Causes of Death.	Age Groups.						
	Under 20.	20-25.	25-30.	30-35.	35-40.	40-49.	All Ages.
Accidents of pregnancy:							
Abortion ..	2	9	15	16	11	2	55
Ectopic pregnancy ..	1	—	14	12	15	8	49
Other accidents ..	2	11	7	7	4	3	34
Puerperal hemorrhage	1	17	23	31	33	24	120
Other accidents of labour ..	2	10	26	35	30	10	113
Puerperal sepsis ..	25	91	133	118	85	33	485
Puerperal phlegmonia, <i>et cetera</i> ..	1	2	7	13	7	2	32
Puerperal albuminuria ..	11	42	49	43	41	17	203
Following child-birth ..	—	—	—	4	5	3	12
ALL CAUSES ..	45	182	274	279	231	102	1,113

TABLE IVA.

	Age Groups.						
	Under 20.	20-25.	25-30.	30-35.	35-40.	40-49.	All Ages.
Total number of births	10,019	54,111	75,642	60,914	36,863	13,845	251,394
Mortality rate per 1,000 births ..	4·49	3·36	3·62	4·58	6·27	7·37	4·42

It will be observed that the rate for ages under twenty is higher than those for the next two groups. This is probably due to the larger proportion of illegitimate births and also to the number of *primiparæ* among whom operative interference is likely to be more frequent. The mortality, after a fall for the second age group, gradually rises with each successive period and at ages beyond thirty is well above the average for the whole period. This result probably reflects the maternal state of health, the high rates below twenty and above thirty-five being due to physical immaturity in the former group and to lessened physical vitality in the latter. As most women over thirty have already borne children, this increased mortality emphasizes the need for better ante-natal super-

vision of all *multiparae*. This is a task which medical practitioners find very difficult to carry out owing to the indifference of such patients.

The variation in the component parts of the mortality by age groups shows that sepsis is highest in ages under twenty, whereas other causes of death, while high in the first group, rapidly increase at later ages. There is the same general trend of both causes of death by age groups, but sepsis rises less steeply.

TABLE V.—INCIDENCE OF SEPSIS AND OTHER CAUSES OF MORTALITY BY AGE GROUPS, PER THOUSAND BIRTHS.

Age Groups.	Puerperal Sepsis.	Other Causes.
Under 20..	2.49	2.00
20-25 ..	1.68	1.68
25-30 ..	1.76	1.86
30-35 ..	1.93	2.64
35-40 ..	2.30	3.97
40 and over ..	2.39	4.98

Nationality of the Mother.

In countries like the United States of America, where there is a mixed population, the nationality of the mother plays a considerable part in the risks attached to child-birth. As the population of Victoria is 98% British in origin this factor is largely eliminated. Recent returns show that 88% of the mothers were born in Australia, 11% in Great Britain and other British possessions and only 1% in foreign countries.

Interval Between Delivery and Death of the Mother.

Table VI shows that one-third of the total deaths occurred during the first day and approximately two-thirds within one week. The interval was longer for deaths from puerperal sepsis than for those due to other causes. Over one-third of the sepsis deaths occurred after the end of the second week, as compared with other causes of death, where three-fourths of the mothers died within the first week after delivery.

TABLE VI.—TIME FROM CHILD-BIRTH TO DEATH OF MOTHER.

Interval.	Causes of Deaths.		
	Puerperal Sepsis.	Other Causes.	Total.
Under 1 day ..	2	331	333 (33 %)
1-7 days ..	131	176	307 (30 %)
1-2 weeks ..	81	44	125 (12 %)
Over 2 weeks ..	159	102	261 (25 %)
TOTAL ..	373	653	1,026

Seasonal Variation.

While there is no definite period during the year when puerperal mortality is most marked, on the whole the late autumn, winter and early spring months (April to October) show an increased incidence of deaths. The number of births during this period is also above the average.

Order of Birth.

During the period 1906-1915 the number of deaths per thousand married women of all ages in first confinements was 5.57 as compared with an average of 4.04 for other confinements. Later statistics are not available. According to Sir T. A. Coghlan, ex-Statistician of New South Wales, the risk attending the first birth is greater than at any subsequent one up to but not including the ninth. The smallest risk was found in the second confinement, although that in the third was not much greater. After the third the risk increased rapidly.

Effects of Illegitimacy.

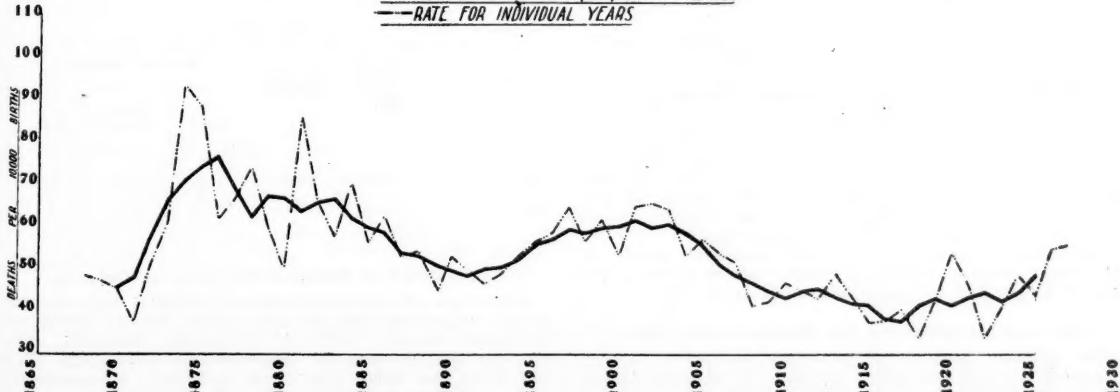
The illegitimate birth rate in Victoria averages 4.46% of the total births. The increased risks experienced by the unmarried mother are well illustrated in Table X. Besides the unmarried woman there are many others whose children have been born within nine months of marriage. In both groups ante-natal supervision is largely inadequate and complications are more likely to occur.

PUERPERAL MORTALITY VICTORIA 1870-1927

DEATHS FROM PUERPERAL DISEASES PER 1000 BIRTHS

— MOVING AVERAGE FOR QUINQUENNIAL PERIODS

— RATE FOR INDIVIDUAL YEARS



The present position in Australia has been well summarized by the Commonwealth Statistician in the 1927 Year Book:

A comparison of the combined total of ex-nuptial first births and nuptial first births occurring less than nine months after marriage with the total of nuptial children born nine months or more was about two to three. At all ages up to and including twenty-one, however, there was a great preponderance of ex-nuptial births and of births following ante-nuptial conception.

Complications of Pregnancy and Labour.

The effect of complications of pregnancy and labour are dealt with in Part II in connexion with the conditions of private practice. It may be stated, however, that there is great need for much more detailed information on death certificates regarding the incidence of Cæsarean section, forceps application and other operative procedures.

The Onus of Responsibility.

In the past much time has been wasted in attempts to apportion between the doctor and the nurse the blame for the excessive mortality in child-birth. Since the operation of the maternity allowance the returns show that in Victoria the percentage of cases attended by a doctor has steadily risen.

TABLE VII.—MEDICAL ATTENTION AT CONFINEMENTS.

Year.	Percentage of Women Attended by Medical Practitioners.		
	Metropolitan Area.	Rest of State.	Victoria.
1911	73	65	68
1918	81	77	79
1926	89	91	90

The year 1911 has been chosen to represent the proportion of cases attended by a doctor prior to the commencement of the maternity bonus in 1912. It will be noted that in recent years the rest of the State has a higher percentage of women attended by a doctor than the metropolitan area.

An investigation of the birth certificates for 1926 of the metropolitan municipalities shows that in the residential suburbs the proportion receiving medical attention is over 90%, whereas in the industrial suburbs lower percentages (58% to 88%) prevail, especially in Richmond, Collingwood, Fitzroy and Port Melbourne. This matter is further discussed when dealing with the conditions of private practice.

No statistics are available to enable a comparison to be made between the results of cases attended by doctors and nurses separately.

Very few women in the State have had neither a doctor nor a nurse present at their confinements.

The Present Incidence of Puerperal Mortality in Victoria.

During 1927 there were 35,074 births and 196 maternal deaths from puerperal causes. The maternal mortality rate per thousand live births was 5.58. Looked at from another angle every 175 confinements accounted for the death of one mother. These figures are slightly better than the average for the whole Commonwealth.

The relative importance of the puerperal group of diseases in causing mortality among women between the ages of fifteen and forty-five is seen in Table VIII.

Maternal Mortality and the General Death Rate.

The relative position of maternal mortality to the general death rate and infant mortality in Victoria during the present century is summarized in Table IX.

TABLE VIII.—DEATHS OF ALL FEMALES FROM FIFTEEN TO FORTY-FIVE: VICTORIA, 1920-1926.—TOTAL DEATHS, 9,843.

Causes of Death.	Number.	Percentage.
Tuberculosis (all forms)	2,545	25.85
Puerperal diseases	1,104	11.21
Diseases of the heart and blood vessels	929	9.43
Cancer (all forms)	713	7.24
Bronchitis, pneumonia	643	6.53
Nephritis	546	5.54
	6,480	65.80

Dame Janet Campbell stated that in Great Britain, while the general death rate had been reduced by one-third and the infant mortality halved since the beginning of the century, the maternal mortality had been but little affected.

The position in Victoria is as follows:

This represents a decrease of 21% in the general death rate and 40% in infant mortality as compared with one of 19% for all puerperal causes. Of the latter, sepsis decreased by 16%, while the rate for other causes was reduced by 20%.

TABLE IX.

Year.	Birth Rate.	Death Rate.	Infantile Mortality.	Maternal Mortality.		
				Puerperal Sepsis.	Other Causes.	Total.
1900	25.81	12.76	95.39	1.88	3.41	5.29
1901	25.77	13.22	102.94	2.29	4.19	6.48
1902	25.23	10.60	80.23	2.23	4.90	6.53
1903	24.53	12.94	106.40	1.79	4.59	6.39
1904	24.74	11.97	77.92	1.54	3.79	5.34
1905	24.96	12.17	83.30	1.76	3.95	5.71
1906	25.41	12.55	92.92	1.65	3.73	5.98
1907	25.59	11.86	72.60	1.37	3.79	5.10
1908	25.07	12.71	86.05	1.54	2.77	4.11
1909	25.01	11.45	71.36	1.14	3.07	4.21
1910	24.51	11.49	76.88	1.71	2.99	4.47
1911	25.01	11.52	68.79	1.87	2.60	4.23
1912	26.36	12.22	74.48	1.70	2.57	4.27
1913	25.77	11.09	70.53	1.80	3.12	4.92
1914	25.37	11.56	78.77	1.68	2.67	4.36
1915	24.45	11.05	68.78	1.14	2.59	3.74
1916	24.20	11.66	74.63	1.60	2.19	3.80
1917	23.40	10.31	56.82	1.33	2.69	4.05
1918	22.19	10.68	61.75	1.36	2.02	3.98
1919	21.47	13.15	67.90	1.29	3.00	4.23
1920	23.95	11.13	73.70	1.71	3.64	5.35
1921	23.16	10.52	72.55	1.63	2.95	4.58
1922	23.10	9.65	53.35	0.85	2.50	3.30
1923	23.31	10.71	65.70	1.50	2.59	4.09
1924	23.01	10.05	61.32	1.55	2.32	4.87
1925	21.49	9.47	56.98	1.08	2.25	4.34
1926	20.84	9.63	55.60	1.81	3.67	5.48
1927	20.31	9.71	56.10	2.22	3.36	5.58

TABLE IXA.

Period.	General Death Rate.	Infantile Mortality.	Maternal Mortality.		
			Sepsis.	Other Causes.	All Causes.
1900-1904	12.86	98.25	1.94	4.05	5.99
1923-1927	9.91	59.14	1.63	3.24	4.81

The Trend of Maternal Mortality in Victoria.

Inspection of the graph shows a general improvement despite numerous peak periods. Three definite waves can be noted, namely, 1870-1889, 1890-1908, 1909-1927. The average annual rates for these periods were 62.22, 55.30 and 44.14 per 10,000 live births and show a decrease of 29% in the last period as compared with the first.

If the average be taken over consecutive decennial periods, the decrease is shown to be progressive except during the past eight years:

1870-1879:	63.81	per 10,000	live births.
1880-1889:	59.27	per 10,000	live births.
1890-1899:	54.53	per 10,000	live births.
1900-1909:	54.54	per 10,000	live births.
1910-1919:	42.04	per 10,000	live births.
1920-1927:	47.11	per 10,000	live births.

The wide variations of the annual figures are probably due in part to the relatively small number of deaths and a truer appreciation of the general tendency towards increase or decrease can be obtained by the use of a moving average rate for five yearly periods as is employed in the graph.

Analysis of the Period 1908-1927

The highest rates during the period 1908-1927 occurred in 1910, 1913, 1920, 1924, 1926 and 1927. The rate for the latter year was the highest recorded since 1905.

In 1910 and 1913 there was no associated increase in the general death rate nor were there any significant epidemics. On the contrary the rates for most diseases were well below the average.

The abnormal rise in 1920 may possibly be related to the influenza epidemic of 1919. This coincided with an increase in the sepsis rate and in mortality from other causes in the latter year. It might be argued that pregnant women who were affected in the later waves of the epidemic, more readily became victims to septic infections and other complications during the following year.

In 1923 a milder outbreak of influenza occurred, but this had probably little to do with the high rate for the next year. No marked increase in other diseases occurred during this period.

Likewise in 1926 and 1927 no extraneous cause of the increased rate could be noted. In the opinion of the Victorian Statistician the high rate was partly due to better certification of puerperal causes of death following on the present investigation.

Similar peak periods have been noted in all the other States. They have not been coincident and are due in part to the relatively small number of deaths in individual States.

The Incidence of Mortality Within the State.

An attempt has been made to discover whether all parts of the State are equally responsible for the mortality rate. Experience in other countries varies considerably. Before making any comparisons a short description of the physical features and distribution of the population of Victoria will be useful.

Victoria is approximately the size of England and Scotland and is the second smallest State in the Commonwealth, although it is exceeded only by New South Wales as regards population. The population in 1927 was

1,727,325, equivalent to 19.65 persons to the square mile. Although this is the most densely populated State, it compares in a striking fashion with the figure for Great Britain, namely 478. The nearest European equivalent is Norway. The capital, Melbourne, contains 55% of the total population. The principal country towns are twelve in number; three have populations around 40,000; the others vary from 5,000 to 8,000 and account for 11% of the inhabitants of the State. The remainder of the State with 34% of the population is mainly rural. The means of communication are better and the distance of any isolated area from a medical practitioner and hospital accommodation is far less than in the larger States.

In England and Wales the rates are high in very sparsely populated rural areas and in industrial and mining districts. Wales, in which such a distribution of the population is well marked, has always shown a higher rate than England. London has a lower rate, especially for sepsis, than the average for the whole country.

Rural areas in Scotland show a slightly higher rate than urban.

The same applies to New Zealand and is particularly noticeable with regard to haemorrhage, albuminuria and accidents of labour and to a less degree with sepsis.

The New York figures record a higher rate for all cases for the State as compared with New York City. The sepsis rate is stationary in both areas, but other causes of maternal mortality have increased in the State. If the total figures for the United States be examined the mortality is found to be higher in the cities than the rural areas. The highest mortality was obtained not in the largest centres, but in cities with populations of 25,000 to 50,000.

E. S. Morris has shown that in New South Wales the rates for Sydney are uniformly higher than those for country towns as well as rural and industrial areas.

Comparison of Melbourne, Rest of State and Victoria.

Table X shows that among married women in Melbourne and suburbs the rates for septicæmias for both periods are greater than those of the rest of the State and Victoria. During 1923-1927 an increase was noted in all areas as compared with the first period. The mortality from other causes shows a greater increase in the second period than is noted in the other areas. The rate for all causes has increased by 6% and is in marked excess of the figures for both Victoria and the rest of the State.

In the rest of the State the sepsis rate for married women is lower than both the other groups, while other causes of mortality are well above the figures of these areas.

The combined figures for the State show an increase from sepsis and other causes.

The table also shows the lamentable position of the single girl, especially in Melbourne where the combined rate is twice as great as that for married women. The mortality in the rest of the State shows a reduction in

TABLE X.—DEATHS FROM PUERPERAL DISEASES IN MELBOURNE, REST OF STATE, AND TOTAL STATE, OF MARRIED AND SINGLE WOMEN PER THOUSAND BIRTHS FOR PERIODS 1918-1922, 1923-1927.

Area.	Period.	Births.		Puerperal Septicæmia.				Other Puerperal Causes.				Total Puerperal Causes.			
		Legitimate.	Illegitimate.	Married.		Single.		Married.		Single.		Married.		Single.	
				No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Melbourne and Suburbs	1918-1922	83,042	6,780	192	2.31	22	3.24	186	2.24	17	2.51	378	4.55	39	5.75
	1923-1927	87,908	5,532	211	2.42	27	4.88	215	2.44	27	4.88	426	4.86	54	9.76
Rest of State ..	1918-1922	70,396	2,099	97	1.22	7	3.33	193	2.43	6	2.86	290	3.65	13	6.19
	1923-1927	82,538	2,395	123	1.49	5	2.09	213	2.58	9	3.76	336	4.07	14	5.85
Victoria ..	1918-1922	162,438	8,879	289	1.78	29	3.26	379	2.33	23	2.59	668	4.11	52	5.85
	1923-1927	170,446	7,927	334	1.96	32	4.03	428	2.51	36	4.54	762	4.47	68	8.57

TABLE XI.—COMPARISON OF VARIOUS AREAS IN VICTORIA:
MORTALITY RATE PER THOUSAND LIVE BIRTHS.

Period.	Area.	Puerperal Sepsis.	Other Causes.	Total Causes.
1918 to 1922	Melbourne and Suburbs ..	2.38	2.26	4.64
	Principal Country Towns ..	1.25	3.01	4.26
	Rest of State ..	1.28	2.24	3.52
1923 to 1927	Melbourne and Suburbs ..	2.54	2.59	5.13
	Principal Country Towns ..	1.70	3.04	4.74
	Rest of State ..	1.43	2.89	4.32
1918 to 1927	Melbourne and Suburbs ..	2.05	2.60	4.65
	Principal Country Towns ..	1.48	3.02	4.50
	Rest of State ..	1.36	2.56	3.92
	Victoria ..	1.95	2.47	4.42

the second period due to a diminution in the sepsis rate. This high rate for unmarried mothers is largely due to an increase in the number of septic abortions.

Comparison of Melbourne, Country Towns, Rural Areas, Victoria.

The principal country towns included are those mentioned in the Victorian Year Book, namely: Ballarat, Bendigo, Geelong, Carrum, Castlemaine, Hamilton, Maryborough, Mildura, Mordialloc, Stawell, Warrnambool, Wonthaggi.

The comparative trend of these figures is more clearly illustrated in the following table.

TABLE XII.—COMPARATIVE TREND OF PUPERPAL MORTALITY FROM 1918 TO 1927.

Cause of Death.	Victoria.	Melbourne.	Country Towns.	Rest of State.
Puerperal sepsis ..	100	126	76	70
Other causes ..	100	98	122	104
Total causes ..	100	110	102	89

It will be noted that the incidence of sepsis is highest for Melbourne for all periods under review. The rural rate is approximately half that of Melbourne, while the country towns show a rate equal to three-fifths of the metropolitan average.

The highest rate for other causes of mortality over the whole period is obtained in the principal country towns. Except for 1918-1922 the figures for Melbourne are the lowest in the State. The rural areas occupy a position midway between those already mentioned. Table X showed that the high rate in the rest of the State was largely due to the mortality from other causes among unmarried women.

Conclusions.

1. Melbourne and suburbs show the highest rate for sepsis and, except in 1918-1922, the lowest rate for other causes of mortality in the State. Owing to the excessive sepsis rate the total mortality greatly exceeds the figures for the other divisions of the State. The industrial area, comprising Melbourne and six of the larger country towns, has a rate equal to that of Melbourne.

2. The principal country towns show a fairly low rate for sepsis, but are handicapped by the highest rate for other causes. The total figure is above the State average.

3. The rate for the rural areas is the lowest in the State. As is the case with the other divisions, there is a tendency for all causes of mortality progressively to increase.

International Comparison of Mortality Rates.

An international comparison of mortality rates is difficult because of variation in the methods employed in

the compilation of statistics. In some countries the rate is calculated as a percentage of live births, while in others still-births are included. In a third group not only still-births in the ordinary sense of the word, but also all infants who do not survive beyond a certain number of days and whose births were not registered before death, are excluded. The completeness of registration of births and deaths also varies. In this respect the Australian standards have been maintained at a high level for many years. Finally all countries have not adopted the International List of Causes of Death. Statistics may be calculated on a basis which excludes deaths not classed as due to pregnancy and child-bearing, but returned as associated therewith. If these cases be added, as is done in the Commonwealth, the rate is appreciably increased.

TABLE XIII.—INTERNATIONAL MORTALITY RATES PER THOUSAND BIRTHS.

Country.	Year	Puerperal Sepsis.	Other Causes.	Total.
Sweden ..	1922	1.06	1.43	2.49
Japan ..	1926	0.97	1.75	2.72
Italy ..	1925	0.99	1.73	2.72
Holland ..	1926	0.90	1.93	2.83
Norway ..	1924	0.62	2.32	2.94
England, Wales ..	1926	1.60	2.52	4.12
New Zealand ..	1926	1.37	2.88	4.25
South Australia ..	1927	1.48	3.31	4.79
Irish Free State ..	1926	1.88	3.01	4.89
Germany ..	1925	2.59	2.38	4.97
Belgium ..	1925	2.83	2.18	5.01
Tasmania ..	1927	2.07	3.52	5.59
VICTORIA ..	1927	2.22	3.37	5.59
Queensland ..	1927	1.26	4.34	5.60
Northern Ireland ..	1926	1.74	3.87	5.61
South Africa (Whites) ..	1925	1.82	3.80	5.62
Canada ..	1926	1.86	3.80	5.66
West Australia ..	1927	2.12	3.77	5.89
Commonwealth ..	1927	2.15	3.78	5.93
Scotland ..	1926	1.69	4.71	6.40
United States of America ..	1925	2.40	4.00	6.40
New South Wales ..	1927	2.58	3.98	6.56
Greece ..	1922	3.57	3.64	7.21

It has already been mentioned that reliance on statistics alone tends to give an erroneous conception of the true incidence of maternal mortality in the individual Australian States because of the relatively small number of deaths in each case. For this reason New South Wales, Victoria and Queensland alone can be reasonably compared with other countries. A comparatively trivial decrease in so small a total number of deaths would place these States in a much more favourable position. This emphasizes the fact that the slightest lowering of the standards necessary for safe delivery of mother and child is more heavily penalized in the statistical results of Australia than in those of other more densely populated areas.

Such international comparisons are, therefore, rather misleading and in any case have little practical bearing on the problems facing Victoria. The State cannot afford the economic and domestic loss caused by the annual deaths of nearly two hundred mothers from causes associated with child-birth. The population is augmented by the natural increase due to the excess of births over deaths and also by immigration. During the past twenty-five years natural increase represents 88% and immigration 12% of the population. Owing to the low birth rates of most countries we cannot look forward indefinitely to a sufficient quota from Great Britain to fill our vacant spaces. Therefore, it is essential that the rearing of children be made safer not only for the mothers, but also for the infants themselves. Our attitude must be one of profound dissatisfaction with the present losses and with the standards which have been deemed sufficient heretofore.

Morbidity.

The actual number of maternal deaths forms only a small though important part of the problem of the total amount of damage and disability associated with parturition. In the strictest sense this term is used to describe

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those who experience an abnormal convalescence after delivery. It is a valuable indication of the standards of work of a medical practitioner or a hospital. If the percentage of morbidity ranges from five to eight, it may be considered satisfactory, but rates, say, of twenty would mean that the methods employed needed rigid inspection and improvement. Further comments on this important subject are made in Part II in which puerperal sepsis is discussed.

In the wider sense the term covers all those women who have survived child-birth, but who have been more or less damaged in health. No exact estimate can be made of the number so affected. Many women accept illness after child-birth as a matter of course. Some attend their doctor for treatment and a large proportion of the work of the gynaecological department of all general hospitals is concerned with the treatment of disabilities directly attributable to child-birth. The records of the Women's Hospital show that 36% of all the admissions to the gynaecological department were due to the effects of a previous confinement. Such estimates necessarily omit the larger group who for various reasons do not or cannot seek surgical relief for their troubles. Therefore it would not be understanding the facts to say that 50% of all mothers suffer from some weakening of bodily function following on child-birth. This general statement emphasizes the need not only for the better conduct of labour, but also for a wider realization of the value of post-natal examination of all cases. The importance of this after-care in the prevention of chronic invalidism has not so far been sufficiently appreciated by the general public.

The Association of Maternal and Infant Mortality.

It has been obvious to infant welfare workers for some time that all attempts to obtain a marked reduction in the mortality under one year have been largely frustrated by the persistent refusal of the age group under one month to react to the measures found successful at later periods.

TABLE XIV.—INFANTILE MORTALITY UNDER ONE YEAR PER THOUSAND BIRTHS.

Period.	Infantile Death Rate.		
	Under One Month.	Over One and Under Twelve Months.	Total Under One Year.
1881-1890	37.2	89.4	126.6
1891-1900	33.8	77.9	111.7
1901-1904	34.3	63.7	98.0
1905-1909	32.9	48.0	80.9
1910-1914	32.6	41.2	73.8
1915-1919	33.4	32.7	66.1
1920-1924	33.0	32.3	65.3
1925	30.9	26.1	57.0
1926	29.7	25.9	55.6
1927	31.8	24.8	56.1

Both the table and the graph show that the mortality under one month has remained practically stationary over a considerable period. Since 1915-1919 the rate between one and twelve months has become less than that of the group under one month.

Infantile Mortality under One Month.

Inspection of Table XV shows clearly that the greatest number of deaths under one month occurs during the first week. The relationship between these figures and the maternal mortality rate is also shown.

Infant Mortality under One Week.

Table XVI shows that 54% of the total mortality under one year occurs before the end of the first month. Three-quarters of this mortality is caused by deaths within the first week of life.

The detailed causes of death under one week for the past three years in Victoria are as follows:

TABLE XV.—INFANTILE MORTALITY BY AGE GROUPS PER THOUSAND BIRTHS.

Period.	Infantile Mortality.					Maternal Mortality Rate.
	Under One Week.	One to Four Weeks.	Total Under One Month.	One to Twelve Months.	Total Under One Year.	
1910-1914 ..	21.5	11.1	32.6	41.2	73.8	4.54
1915-1919 ..	23.3	10.1	33.4	32.7	66.1	3.84
1920-1924 ..	23.7	9.3	33.0	32.3	65.3	4.23
1925 ..	23.1	7.8	30.9	26.1	57.0	4.34
1926 ..	22.6	7.1	29.7	25.9	55.6	5.48
1927 ..	22.6	8.7	31.3	24.8	56.1	5.58

TABLE XVI.—INFANTILE MORTALITY UNDER ONE WEEK : VICTORIA, 1922-1926.

Age.	Number of Deaths.
Under one week	4,100
One to four weeks	1,497
Under one month	5,597
One to three months	2,010
Three to six months	1,347
Six to twelve months	1,562
Under one year	10,516

TABLE XVII.—CAUSES OF DEATH UNDER ONE WEEK : VICTORIA, 1925-1927.

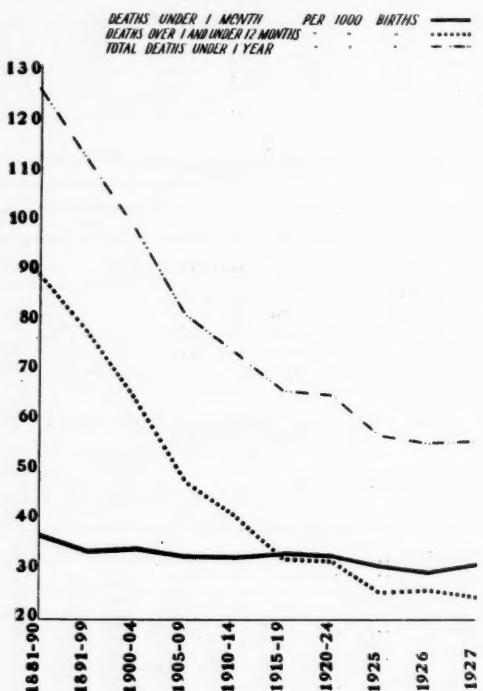
Causes of Death.	Number of Deaths.	Percentage of Deaths.
Premature birth	1,215	50
Injury at birth	303	13
Congenital debility	290	12
Diseases of early infancy	248	10
Congenital malformations	219	9
Convulsions	38	2
Bronchitis, pneumonia	29	1
Other causes	81	3
ALL CAUSES	2,423	

It will be noted that practically all the causes of early infant mortality are directly related to conditions associated with pregnancy and labour. Autopsy results tend to alter the position of some of these factors. Prematurity is displaced from first place, while the toxæmias rise in the scale. The importance of syphilis was not noted in the *post mortem* records of the Women's Hospital as frequently as was expected. The one factor occupying a high place was that of the complications of labour and birth trauma. Intracranial injuries were observed in 80% of the infantile deaths following breech delivery, in 68% of forceps applications and also in 36% of the normal deliveries (premature and macerated infants were excluded from the series).

Still-births and neo-natal deaths are, therefore, influenced more by the complications of labour and the methods of delivery than by the results of ill-health of the mother during pregnancy. While in our present state of knowledge we cannot prevent every case of eclampsia or of the other toxæmias, nor do we know much about the causation of congenital debility and malformations, yet efficient ante-natal care will reduce the number of premature infants and so improve the still-birth and neo-natal rates. The paramount importance of birth injuries makes it imperative to learn how to limit the occasions for interference with natural birth. As has been already noted the compulsory notification of still-births will afford useful information which is largely lacking at present in the State records.

An investigation was also made to ascertain whether any particular part of the State showed a higher mortality

INFANTILE MORTALITY UNDER ONE YEAR VICTORIA 1881-1927



than other areas. The results prove that Melbourne has a higher rate than either the rest of the State or Victoria as a whole. This was most noticeable in regard to prematurity, birth injuries and congenital malformations. Deaths from prematurity were more prevalent in the industrial suburbs than in the residential areas, while the reverse was observed as regards birth injuries.

TABLE XVIII.—INFANT MORTALITY UNDER ONE MONTH :
VARIOUS AREAS, VICTORIA, 1922-1926, PER THOUSAND BIRTHS.

Cause of Death.	Mortality Rate.		
	Melbourne.	Rest of State.	Victoria.
Prematurity	16.16	13.39	14.76
Injury at birth and diseases of early infancy	5.86	5.15	5.51
Congenital debility	4.01	4.58	4.29
Congenital malformations	2.97	2.55	2.76
Bronchitis	1.14	0.70	0.92
Convulsions	0.69	0.90	0.80
Diarrhoea	0.45	0.59	0.52
Other causes	1.82	1.33	1.58
ALL CAUSES	33.10	29.19	31.14

Summary of Statistical Investigation.

1. Under existing conditions there is a sacrifice of one mother in every 175 confinements. Although slight improvement has been noted during the past twenty-five years,

the rate has recently begun to rise and the figure for 1927 is the highest recorded since 1905. In addition to the actual number of deaths, there is a very large amount of chronic invalidism which cannot be exactly estimated.

2. The mortality is greatest in the metropolitan area, followed in order by the principal country towns and the rural part of the State. Sepsis is excessive in Melbourne, whilst other causes of mortality are most marked in the country towns. The total rate shows a tendency to increase in all divisions of the State.

3. Puerperal infection is the most important single cause of death and is responsible for over two-fifths of the total mortality. The prevalence of abortion and the high death rate of unmarried mothers represent factors of considerable importance.

4. Nine-tenths of deliveries had medical supervision and the proportion was higher in the country than in Melbourne. It does not follow from this that all pregnant women have been under adequate supervision throughout pregnancy and labour. Many women have only seen a doctor because of complications or owing to distances have only seen a doctor at the commencement of labour.

5. The problem of maternal mortality is closely associated with that of still-births and early infantile deaths. The neo-natal mortality is mainly due to complications of labour and intra-cranial birth injuries as well as to diseases caused by maternal ill-health during pregnancy. As is the case with maternal mortality, the highest neo-natal death rate is found in Melbourne rather than in the rest of the State.

PART II.

ADMINISTRATIVE CONTROL OF HEALTH IN VICTORIA.

There is no central authority controlling the health affairs of the State. Two departments are responsible, namely the Minister of Health and the Treasurer.

As far as obstetrics is concerned the Minister of Health, through the Health Department, administers the *Health Act*, *Midwives Act*, and the *Nurses' Registration Act*. The Treasurer, by means of the Charities Board, controls all public hospitals and allied organizations such as nursing societies, refuges and benevolent homes. A commission of public health comprising the Chief Health Officer as Chairman and six representatives of the medical profession and municipal councils administers the *Health Act*. Resolutions of the Commission are carried out as far as possible by the Health Department, although the former has no control over the officers of the Department and cannot expend any funds.

The *Midwives Act* is administered by the Health Department and not by the Commission. Inspection and registration of private hospitals are controlled by the Commission and not as formerly by the local municipalities.

Public Hospitals.

The proper distribution of public hospitals throughout the State is undertaken by the Charities Board. This is an elective and honorary board dealing with the whole field of public hospital administration as well as associated philanthropic organizations. The Secretary of the Board is also Inspector of Charities and forms the connecting link between the Board and the Treasurer. He deals with details of maintenance, equipment and general service and in effect determines whether a proposed hospital is an efficient working unit for the convenience of patients, medical officers and nurses. Hospitals are approved at selected points in order to prevent overlapping and duplication of services. Maternity wards have been added to public hospitals at Ballarat, Hamilton, Horsham, Maryborough, Dunolly, Daylesford and Maldon, while in Geelong the ward is not yet opened. Extensions are projected in the future at many other existing centres.

Private Hospitals.

Private hospitals are controlled by the Minister of Health through the Health Department. If the hospital

degrees to be registered as an obstetric training school it is supervised by the Midwives Board as regards the training regulations. This Board, although under the Minister of Health, is separate from the Commission of Health.

Other Organizations.

Refuges and district nursing associations are solely under the control of the Charities Board.

The Bush Nursing Association, being a private organization, is under Government supervision only for the approval of building plans of the bush hospitals.

Infant welfare associations are conducted by two societies. A Director of Infant Welfare, responsible to the Minister of Health, controls the work throughout the State.

It will be readily seen that this unsatisfactory division of authority between two departments does not conduce to efficiency. There are too many loopholes for evasion of responsibility or the shelving of important matters. All health activities in the State should be under one Minister with a central advisory authority to control the adequate distribution of hospitals and allied nursing and philanthropic organizations throughout the State.

HOSPITAL ACCOMMODATION IN VICTORIA.

As approximately two-thirds of all confinements occur either in public or private hospitals, the standards attained by both classes are of the highest importance.

Public Hospitals in Melbourne and Suburbs.

The Women's Hospital contains 132 beds and in 1927 the number of deliveries was 2,915, a greater number than any other Australian maternity hospital. Attached to the hospital is a large ante-natal department from which patients requiring hospital treatment are admitted to the pre-maternity wards. During the past two years the efficiency of the hospital as the premier training school of Victoria has been increased by the addition of a theatre for clinical instruction and the performance of major obstetrical operations. An after-care department insures early correction of any troubles arising from parturition. In order to cope with increasing demands for laboratory investigation, an assistant to the pathologist and a bio-chemist have been added to the staff. Adequate laboratory accommodation is, however, lacking and until this is remedied there will be no room for the bacteriologist necessary to complete the team of scientific workers.

The Queen Victoria Hospital is staffed by women doctors and admits only women and children. There is no instruction of students, but nurses receive an excellent obstetric training. The present obstetric block contains nineteen beds and is too small. A new wing to accommodate ninety patients is near completion and will afford better scope for the staff. It will then be necessary to consider the question of training students. Regular ante-natal attendance is required of all patients and the value of this is seen in the hospital records. Attached to the hospital is a venereal diseases department which is doing very valuable work.

The Alfred Hospital has no indoor accommodation at present, but there is a rapidly growing ante-natal clinic. A complete maternity service should be possible in the near future.

Private Hospitals in Melbourne and Suburbs.

In the metropolitan area 173 private hospitals have been inspected and graded as follows:

Taking obstetric cases only	113
General hospitals with separate accommodation for obstetric cases	4
General hospitals with no separate accommodation	56
Conducted by trained nurses	120
Conducted by practice nurses	53
Satisfactory according to present standards only	111
Poor or bad	62

There was no provision for a labour ward in 56 hospitals, the operating theatre was used in 32, while a labour ward of varying quality was noted in 85.

It is a matter for regret to note that the regulations apply almost exclusively to matters of building and sanitation. There is no authority under the *Health Act* to compel proprietors of private hospitals to conform to a reasonable standard of equipment or efficiency.

The following outstanding defects have been noted:

1. Many hospitals are poorly furnished and lack proper means of sterilizing dressings *et cetera*. Only 40% could be considered to possess a fairly satisfactory system of sterilization.

2. Patients with surgical and medical afflictions are frequently mixed with obstetric patients and the precautions taken to avoid infection are not adequate. Separate accommodation for obstetric patients was noted in only four out of 60 mixed hospitals. This type of hospital should be abolished as soon as possible.

3. Isolation accommodation for suspicious or definitely septic cases was absent in practically every hospital. This should be provided in all hospitals with more than one bed in a room.

4. In many instances the hospitals were under-staffed and no provision was made for a nurse on night duty. The worst type of hospital was kept by nurses who visited outside patients as well. Patients were left for considerable periods without any skilled attention. These nurses should be compelled in the event of temporary absence from the hospital to leave a trained substitute in charge.

5. Few hospitals had a good nursery, about 5%. Infants frequently slept with their mothers or were kept in the staff dining-room or kitchen. Artificial feeding was prevalent and apparently resorted to in order to save trouble or keep the infants quiet.

6. Many of the smaller hospitals did not keep good records and some of the practice nurses were unable to record temperatures. The use of a standard book of charts should be insisted upon. Such books might be made available at cost price by the Midwives Board. Their use by private nurses should also be made compulsory.

The contrast between the intermediate type of hospital, St. George's and Bethesda, and the average nursing home strongly emphasizes the need for modern maternity units in selected areas to replace the present unsatisfactory private hospitals.

Country Obstetric Hospitals.

In all 262 hospitals have been visited and classified.

Satisfactory	181
Poor or bad	81
Conducted by trained nurses	181
Conducted by practice nurses	81
Provision of labour ward or operating theatre	154
No separate provision	108

In the larger country centres conditions were found similar to those in the metropolitan area. Some of the best private hospitals in the State were established in the smaller towns. The gradual extension of maternity wards attached to the public hospitals as well as the increasing number of bush nursing hospitals is having a marked influence on country standards.

The inspection of private hospitals by the Health Department has aroused much hostile criticism. There is an apparent discrimination between the hospitals conducted by trained and untrained nurses. Whilst the former are frequently inspected and made to conform with the regulations, undoubtedly many smaller homes are allowed to continue without obvious defects being remedied. The concentration of some inspectors on trivial details has also been the source of much irritation. These criticisms apply mainly to Melbourne. In the country the district health officers have recognized that some latitude is occasionally necessary and by such cooperation and commonsense in the interpretation of regulations have managed to retain the

confidence of both doctors and nurses. Inspection of hospitals should be frequent and strict and all should be made to conform to a high standard.

A summary of the conditions found after an inspection of 435 obstetric hospitals throughout the State is given in Table XIX. It should be recorded that every facility has been afforded for this survey both by the Health Department and by those in charge of hospitals. Questions were freely answered and in return constructive criticism invited.

TABLE XIX.—CLASSIFICATION: OBSTETRIC HOSPITALS, VICTORIA.

Classification.	Number.
Hospitals inspected..	435
Conducted by double certificated nurse ..	229
Conducted by obstetric trained nurse ..	72
Conducted by practice nurse ..	134
Hospitals taking obstetric cases only ..	228
General hospitals with separate provision obstetric cases ..	40
General hospitals without separate provision obstetric cases ..	167
Hospitals with separate delivery room ..	178
Hospitals using operating theatre ..	93
Hospitals with no special facilities ..	164
Hospitals with adequate sterilizing plant ..	154
Hospitals with separate accommodation for infants ..	20
Good ..	70
Fair ..	242
Poor ..	123

Nursing Associations, Welfare Societies and Allied Organizations.

Melbourne District Nursing Association.

The district nurses are doing valuable work in the industrial suburbs. They work in conjunction with the local doctors or, if no doctor be engaged, with students from the Women's Hospital and trainees from the Queen Victoria Hospital. All complications are immediately reported to the Women's Hospital or seen by a local doctor. During the past three years the nurses have delivered approximately 1,500 women without a maternal death. All medical practitioners who have worked with them, are well satisfied with their assistance.

An after-care home has been opened to accommodate semi-convalescent patients from the public hospitals and also invalids requiring more attention than they can receive at home. As maternity patients have frequently to be discharged sooner from hospital than is desirable because of lack of beds, this home has proved of great value to the Women's Hospital. The extra rest so afforded makes all the difference, not only to the health of the mothers, but also to the prospects of successfully feeding their infants. Extension of this scheme to other industrial suburbs would be most beneficial.

Refuges.

The majority of the refuges do not act as obstetric hospitals, but care for the inmates before and after confinement. In the case of Ballarat, where highly efficient obstetric service can be obtained at the public hospital, it is most undesirable that the refuge should continue so to act. The Salvation Army Home at Fitzroy is a credit to the efforts of the matron and her staff.

Bush Nursing Association.

The work of the Bush Nursing Association has a very definite bearing on maternal mortality in country districts. The nurses must possess a general and an obstetric certificate and in addition every encouragement is given to qualify for the mothercraft diploma.

Three stages exist in the organization. First, the centre where the nurse boards with a family and attends to patients wherever wanted. In addition, medical inspection of school children and instruction in hygiene are given at the schools. The next stage is the erection of a small cottage for the nurse. There may be a ward attached to this to accommodate one or two patients. Finally with the construction of a properly equipped hospital, the centre

becomes capable of attending to most patients without necessitating their removal from the precincts of their homes. With this class of centre the nurse does not attend outdoor patients. There are at present sixty centres and seventy-two nurses engaged in the work. At seventeen centres there is no special accommodation for the nurse, in twenty-eight a cottage is provided and fifteen bush hospitals have been established at more important localities. All practitioners in the district are entitled to look after their patients in the hospitals. The nurses are selected women with special qualifications and in every area visited the medical men were enthusiastic in their appreciation of the help afforded by them. Ante-natal supervision is carried out in a thorough manner and all abnormal cases referred to the nearest doctor. From 1922 to 1927 there were 2,273 confinements without a single maternal death. This fine record has since been maintained. The still-birth and neo-natal deaths were also considerably below the State averages. These splendid results are due to the mutual cooperation of doctors and well trained nurses, the insistence on continuous ante-natal care and the removal of all complicated cases at the earliest possible moment to properly equipped hospitals, if necessary, in larger towns where more skilled help is available.

Ambulance Services.

It has been estimated that the requirements for transport in the country would be met by the establishment of thirty-one ambulance centres. This work has been steadily progressing until only ten of the towns selected for this purpose remain without an ambulance service. It is worthy of note that the ambulance services in Victoria are almost exclusively confined to transport activities with as far as possible trained attendants.

THE TRAINING OF THE MEDICAL STUDENT.

A sound knowledge of obstetrics is of fundamental importance to the general practitioner. He must know how to conduct a labour safely, especially if complications be present. In other diseases or illnesses there is usually ample time available to seek additional help. This is not the case with many obstetrical complications. Decisions have often to be made and acted upon single handed and any misjudgement affects two lives. Finally the toll of death and suffering associated with parturition is formidable, comprising a high maternal mortality, a large number of still-births and neo-natal deaths and much chronic ill-health among those who survive. Because trouble arises principally in the abnormal case, the chief requirement is medical skill and this can only be accomplished by adequate training.

The Present Course.

The subjects of obstetrics and gynaecology are taught at Melbourne University by a part-time lecturer receiving £200 per annum. Associated with him are three demonstrators and a clinical tutor. During the fourth year the student attends a course of sixty theoretical lectures in obstetrics, infant welfare and gynaecology. The demonstrators give lectures and conduct a course of operative obstetrics for each batch of students. In the following year the student enters the Women's Hospital for his practical course. Each student remains in residence for five to six weeks, four of which are spent in work in the hospital and two in the externe department. During this time he receives ante-natal instruction from the honorary obstetric staff of the hospital and attends patients in the labour ward. The medical superintendent who acts as clinical tutor, undertakes clinical instruction in the wards and additional practical exercises. A refresher course consisting of ten to twelve clinical demonstrations is held during the sixth year. The lecturer is endeavouring to arrange in addition residence in hospital for a period of seven to ten days.

The main defects in this course are as follows: (1) The length of the interval is too long between theoretical and practical instruction. It is not easy to overcome this owing

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to the demands of other subjects. (ii) The period of residence in hospital is too short and compares poorly with the time devoted to other clinical subjects. The present term of six weeks should be increased to three months in order that the student may live in an obstetric atmosphere long enough to enable him to be thoroughly taught. (iii) Contrary to the custom in other countries, the amount of work done in the externe department is rather limited. At present patients are attended under the supervision of the district nurses. The Women's Hospital should have complete control of a properly constituted externe department with adequate medical and nursing supervision. Externe work is of service in making the future practitioner observant and self reliant. It promotes a feeling of personal responsibility and is a valuable method of instruction in the art of handling patients. (iv) Continuous supervision of the student by responsible senior teachers is impossible under the present system. Much has been accomplished, but there are definite limits to the value of part-time work.

Much adverse criticism has been expressed by medical practitioners regarding the inadequacy of the course in their day. It is recognized that improvements have occurred, but as long as the subject is regarded as worthy of a part-time appointment only, no real advance can be made. The crux of the situation lies in the teacher. He must be an experienced man who can devote the whole of his life to the work. A limited amount of consultant practice is essential for successful teaching, but his primary interest must be the thorough and intensive training of the student.

The need for a Chair of Obstetrics was recognized by the Obstetric Inquiry Committee in 1924 prior to this investigation. A resolution on the subject was submitted to the Council of the Victorian Branch of the British Medical Association and subsequently passed by that body.

It would tend to improve the teaching and help to standardize the methods employed if there were an interchange of examiners between the Universities of Melbourne, Sydney and Adelaide.

Post-graduate Instruction.

The best opportunity to gain further experience is provided by a house surgery at either the Women's or Queen Victoria Hospitals. Unfortunately there is a limit to the number of these appointments and it would not be wise to increase them and so lessen the value of the instruction. Further opportunities will be afforded when the Alfred Hospital opens an obstetric department and when more country base hospitals provide maternity wards. At the same time, a scheme for establishing resident clinical appointments should be considered.

A winter residential course is conducted at the Women's Hospital and is largely attended. The Post-Graduate Committee also arranges for speakers on obstetrical subjects to address country meetings. With the formation of a proper obstetrical department in the University it would be possible to conduct short demonstrations at various centres. Attendance at such meetings would not entail the loss of time and financial outlay which is associated with the longer Melbourne course. Similar meetings could be arranged at suitable hours for metropolitan practitioners. This would stimulate interest and encourage men to practise what had been demonstrated to them.

The establishment of a higher degree in obstetrics should be considered by the combined universities. Its attainment might be made an essential qualification for holding senior staff appointments in obstetric hospitals. Such a nucleus of well trained men would gradually exercise a powerful influence throughout Australia.

As the result of many conversations with practitioners it is considered that the time is ripe for the recognition of obstetrics as a subject of more than equal importance than any other branch of clinical medicine to the general practitioner. Instruction of students is only one side of the work. The head of the department must be in touch with the practising members of the profession, stimulating interest and making them realize that obstetrics is a subject well worth life-long devotion.

THE TRAINING, REGISTRATION AND PRACTICE OF THE OBSTETRIC NURSE.

The Midwives Board is concerned with the training and practice of all obstetric nurses in the State. It is composed of public service doctors and has in association a board of examiners who are all in private practice. The Director was appointed a liaison member of the board in order to keep them well informed of the views of the examiners and of the obstetrical members of the profession generally. For some time the board has recognized the necessity for the appointment of an inspectress of midwives. Owing to the limited funds at its disposal this has hitherto not been attainable. In 1927 the appointment was made and the results to date have fully warranted this action. The inspectress has devoted her first year to a thorough inspection of all training schools, to the investigation of complaints against nurses and hospitals and as far as possible to the inspection of visiting nurses. As the result of her tactful methods the regulations have been complied with, particularly by the untrained type of nurse, more generally than in the past. There is, however, too much for one person to do and it is recommended that one inspectress be attached to each district health officer, with at least two in the metropolitan area. The salary and travelling expenses of the inspectress have been paid from the funds of the board obtained from registration and examination fees of nurses and are not a charge on the Treasury. Further extension will entail such expenditure.

Training Schools.

Victoria is the only State in which private hospitals have been registered as training schools. In 1925 there were thirty-four hospitals on the list, twenty-eight in Melbourne, four in the country and two in New South Wales. Since then six have ceased to train and it is proposed to limit the numbers further to fourteen in Melbourne and four in the country. Additions will be made when base hospitals in the country establish maternity wards.

Requirements of a Training School.

Training schools should comply with the following requirements:

(i) The nurse in charge should possess both general and obstetric certificates. One at least of the staff must in addition possess a certificate of mothercraft training. Two double certificate nurses must be actively engaged in the instruction of the trainees.

(ii) The minimum number of women delivered in the hospital should be one hundred *per annum* and each trainee must actually deliver twenty women during her course.

(iii) If the training school be a mixed hospital, the obstetrical unit should be completely separated from the other departments.

(iv) Ante-natal work and mothercraft training must form an essential part of the course. A proportion of the women must also be attended in the externe department of the hospital.

The main defects of the majority of the private training schools are as follows:

(i) Many of the hospitals have too low an average of occupied beds and cases *per annum*.

(ii) The number of women actually delivered is too few in many schools. Ante-natal experience is non-existent and a knowledge of mothercraft seldom imparted to the trainees.

(iii) It is obvious to the board of examiners that thorough instruction of trainees is often wanting and that no attempt is made to insure a reasonable standard before a nurse sits for examination.

Metropolitan Training Schools.

At the Women's Hospital two classes of trainees are accepted; a six months' post-graduate course is given to nurses with a general certificate and a twelve months' course to others. The value of the course would be increased by the development of an externe department.

The provision of tutor sisters would insure that the trainees were supervised throughout their course in a manner which is impossible under present conditions.

The Queen Victoria Hospital admits only six month trainees. In addition to the hospital practice, they attend externe patients with the district nurses.

St. George's and Bethesda Intermediate Hospitals are the next most important training schools and possess excellent records. The lack of ante-natal instruction and externe practice, however, constitutes an omission from the ideal.

The remaining private hospitals vary considerably. In only the minority does the nurse receive a fairly adequate training.

Country Training Schools.

The public hospitals at Ballarat and Hamilton provide a course well above average standard. The other centres at Colac and Castlemaine suffer from many of the defects already noted, although this is minimized by the personal interest taken in the trainees by the local practitioners. Whenever maternity wards are established at more of the larger hospitals, they should prove of equal value to the present centre at Ballarat.

Number of Nurses on Register of Midwives.

When the *Midwives Act* became law in 1915 all women practising obstetrics were required to register. Three classes were formed:

(i) Those nurses holding a certificate from the Women's Hospital or such other equivalent from other States as approved by the board. Registration under this section was permitted until the end of 1916.

(ii) All women who could produce evidence of having been in *bona fide* practice for two years prior to the *Act*. No further registrations under this clause were permitted after 1917. This class was termed "practice midwives."

(iii) After 1916 it was compulsory for all applicants to pass an examination after the prescribed course, six months for a nurse with previous general training, twelve months for other trainees.

From the time the *Act* came into force until December, 1927, 4,122 midwives have been registered and 1,222 de-registered, mainly on account of death, old age, marriage and cessation from nursing. At present there are 2,900 midwives registered; 42% are practice nurses and the remainder trained. Some are in other States and many are not actively engaged in obstetric work. No exact estimate can be given of the proportion in practice.

Obstetric Nurses in Private Practice.

As elsewhere the greatest difficulty is experienced in attracting the right type of nurse to undertake obstetric work. Many are repelled by the conditions of the average training centre and later by the inferior status of the work, due to the influence of partly trained and untrained women who are prepared to do domestic work in addition. To encourage the genuine nurse an endeavour must be made to make the best training available for her. At present the main training centres are largely staffed with nurses who have no intention of undertaking obstetric work after registration. The following is suggested as a means of overcoming this difficulty.

A short course of three months should be part of the training of every general nurse, so that she can deal with possible emergencies in the future. It would not entitle her to practise as an obstetric nurse. For those desirous of doing such work a further post-graduate course of nine months would be essential. In order to afford the best instruction all such trainees should be concentrated at the Women's and Queen Victoria Hospitals. Any vacancies at these hospitals as well as at other training schools would be available for those taking the short course. The excellent scheme of the Bush Nursing Association, whereby nurses are paid a bonus after obstetric training and sign a contract to serve for two years, is worthy of State consideration in this connexion.

The problem of the visiting or morning nurse is of considerable importance, especially in industrial suburbs.

Apart from the district nurses the majority engaged in the work are practice nurses. Despite the regulations many do not visit their patients twice daily. There is, therefore, no record of the evening temperature and consequently incipient cases of sepsis may be missed. The majority work alone and send for medical aid only in emergency. In some suburbs such aid is obtained from practitioners of doubtful obstetric repute. The number of women attended daily should be more limited and the keeping of accurate records insisted upon, otherwise a potential source of infection will remain untouched.

The interest of the State at present ceases with the registration of the nurse, provided that she does not infringe the regulations. No attempt is made to keep her abreast of modern developments. Post-graduate refresher courses should be given at the main training centres throughout the State. All nurses on the active list should be compelled to attend a course of one full week every three years. Special courses could be employed for disciplinary purposes for any careless or ignorant women in lieu of suspension or even removal from the register. The nurse should receive compensation for a *locum tenens* during her absence unless undergoing a disciplinary course. Revision of theoretical and practical work with information regarding the latest developments would form the basis of the work. In addition any alterations in the regulations could be explained and this would remove much misunderstanding and hostility.

It is also reasonable to expect that after passing an act to insure the provision of registered midwives, the State should see that it is strictly enforced. Legal evasions are all too common. An amendment is required of the clause forbidding an unregistered woman to attend a patient "for gain." This would be better expressed "whether for gain or not." In addition the emergency clause allows of wide evasion of the regulations. It should be insisted upon that in all such cases the unregistered woman must immediately send for a medical practitioner or a registered midwife to carry on with the case. The *Act* is being further defeated by unregistered women making no charge for obstetric attention, but receiving money for acting as domestic helps. Unfortunately, these evasions of the *Act* have occurred with the apparent connivance and approval of certain practitioners. The practice savours of "covering an unregistered person" which in Great Britain would render the doctor liable to severe professional penalties. The remedy rests largely in the hands of the medical profession. Registered nurses are discouraged from starting in such areas or, as happened recently, may even have to cease work because of this unfair competition.

Nursing, especially obstetric nursing, is an arduous profession and the monetary rewards are not commensurate with the hard life. It is impossible for the average nurse to earn enough so that after her comparatively brief professional career she can look forward to comfort in later years. For this reason it is highly satisfactory to note that under the stimulus of the Charities Board a scheme of pensions for nurses is now being evolved.

THE PRESENT STATUS OF OBSTETRIC PRACTICE IN VICTORIA.

Personal interviews with a large proportion of those actively engaged in obstetrical work have formed the most important section of this investigation. In all 633 practitioners were interviewed, 304 in Melbourne and 329 throughout the State. Information obtained from this source forms the basis of the following comments.

I desire to take this opportunity of thanking my colleagues throughout the State for the invariable courtesy shown to me personally and the very evident desire to assist the investigations.

Ante-natal Supervision.

The aim of modern obstetrical practice is the maintenance of normal health during pregnancy with the elimination of any complications, so that healthy infants will be born with the least amount of damage to the mothers. For too long has it been the custom of the public to

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consider that the performance of child-birth demands no special preparations. Therefore it is not surprising that only 50% of the doctors seen in Melbourne and not more than 35% in the country were satisfied with the amount of ante-natal care they gave their patients.

The Federal Royal Commission on Health urged that the maternity bonus should be paid only after submission of a certificate of adequate ante-natal supervision. Political expediency has ignored this wise decision. Despite the provision of large ante-natal clinics at the public maternity hospitals as well as a certain amount of instruction at baby health centres, doctors practising in industrial areas find it very difficult to get many women to attend. *Primiparae* are realizing the advantages of such care, but *multiparae*, especially if previous confinements have been normal, are largely indifferent. The added risks which such mothers run have been referred to in Table IV and emphasize the need for supervision of all pregnant women.

With such attention at least 90% of women can approach confinement with confidence. In the remaining group many abnormalities can be remedied or an appropriate line of treatment determined before labour commences. In both instances there will be a lessened risk of sepsis. In many industrial suburbs practitioners do not or cannot persuade their patients to attend during pregnancy and depend upon the nurse who is often untrained, to inform them if progress be not made. It is then too late to rectify mistakes and this procedure ends in difficult deliveries with a high infant death rate and much mortality and morbidity among the mothers. The public and some of the profession have yet to learn that operative dexterity during delivery cannot compensate for lack of care during pregnancy. In the country, where for various reasons ante-natal supervision is more difficult, the doctor generally insists on seeing patients whenever they come to hospital and even at this stage much preventive work can be accomplished. The bush nursing records as well as those of many country practitioners amply bear this out.

There is need for the establishment throughout the State of ante-natal clinics. Apart from attaching them to all public hospitals with maternity accommodation, the ideal situation is at the numerous infant welfare centres. They should be staffed with nurses trained to take histories, able to perform palpation and to test urines. No further treatment should be allowed. All patients with abnormal conditions should be referred to their doctors or in suitable circumstances to public hospitals. Such clinics would relieve the busy practitioner of the necessity of instruction in general hygienic principles and details of infant welfare besides assuring him that it had been properly done. It would be advisable to alter the booklet issued by the Maternity Allowance Department and substitute shorter leaflets on different subjects. These could be given at intervals to mothers by the clinic nurses and would probably be read and acted upon in a more satisfactory fashion than is the present pamphlet.

The Complications of Pregnancy.

Eclampsia.

The advantage of ante-natal care of all pregnant women is best illustrated by the effects of treatment in cases of

albuminuria and eclampsia. Although the incidence of eclampsia is not more than two per thousand deliveries in the records of private practice in Melbourne, there are many emergency cases, especially in industrial suburbs. As Dr. Green shows in Part III of this report, these were responsible for 35% of the maternal deaths in the Women's Hospital. The increased liability shown by such patients to septic infection following any operative procedure adds to the importance of this complication of pregnancy. It is an even greater cause of maternal mortality in the rural parts of the State, except in centres where careful ante-natal supervision is possible.

Ante Partum Haemorrhage.

Ante partum hemorrhage is likewise more serious in the country than in Melbourne. The frequent association of one type of hemorrhage with pre-existing renal disease emphasizes the importance of ante-natal care. It has not been sufficiently recognized that hospital treatment is essential for all such patients. In some instances the results indicate the need for more conservative methods of treatment.

Contracted Pelvis.

Although mild degrees of contraction are fairly common in Melbourne, contracted pelvis is a rare disability in the rest of the State. It is difficult to obtain exact details of pelvic measurements and in too many cases sufficient time is not allowed for the natural forces to attempt delivery. This complication emphasizes the need for efficient instruction of students. Too many men are prone to ascribe delay in labour to contracted pelvis when some other easily recognized and preventable condition is the real cause of obstruction. There is a temptation to perform Cæsarean section regardless of the consequences noted in the next paragraph.

Cæsarean Section.

The abuse of Cæsarean section has assumed serious proportions all over the world. On the whole, the incidence in the State has decreased considerably, but far too many are still being performed. The operation has been done without any regard for other methods of delivery, without a preliminary trial of labour and without consultation with a reputable obstetrician. Owing to defective knowledge many men find it easier to say that a woman cannot be delivered in any other way than to try if it be possible.

Comments.—Trial labour was carried out only thirty-three times. There was a history of previous difficult labours in sixteen instances. Repeat Cæsarean section was performed nine times. A central insertion of the placenta was encountered in thirty-one women, with five deaths. A marginal insertion occurred twenty-five times. In the majority the eclampsia was mild and no attempts at effective eliminative treatment were made before operation. Many patients with severe toxæmia were treated, especially in country districts. There were eight fibromyomata and four ovarian tumours. The concealed type of accidental haemorrhage took place four times, with two deaths. External hemorrhage occurred twice. The miscellaneous group includes rigid cervix, dystocia follow-

TABLE XX.—INDICATIONS AND RESULTS OF CÆSAREAN SECTION FROM RECORDS OF PRIVATE PRACTITIONERS IN VICTORIA.

Indications.	Total Number of Patients.	Parity.		Maternal Mortality.		Infant Mortality.		
		Primiparæ.	Multiparæ.	Deaths.	Rate.	Still-born.	Neo-natal.	Rate.
Contracted pelvis ..	161	133	23	8	4.97%	12	3	9.31%
Placenta previa ..	56	15	41	5	8.92%	6	2	14.28%
Eclampsia ..	29	28	1	5	17.24%	5	1	20.69%
Pre-eclamptic toxæmia ..	21	19	2	9	42.86%	10	—	47.61%
Tumours ..	12	6	6	4	33.33%	1	1	16.66%
Accidental hemorrhage ..	6	1	5	2	33.33%	5	—	83.33%
Miscellaneous ..	24	14	10	6	25.00%	8	—	33.33%
ALL INDICATIONS ..	309	216	93	39	12.62%	38	7	14.56%

ing previous abdominal and vaginal operations, locked twins, fetal ascites, congenital malformation of vagina, diabetes and cardiac disease.

A maternal mortality from all causes of nearly 13% does not reflect credit on the operators either as regards diagnostic skill or surgical technique. These results have been improved upon in many cases by more conservative methods of delivery.

Labour.

The proportion of patients treated in hospital varies from 20% to 90%, depending mainly on the locality and the standards of the hospitals. The preparations for labour as regards sterile dressings and so forth leave much to be desired. It would be of considerable help if the Health Department formulated minimum standards not only for the preparation of patients, but also for the delivery room and its accessories. For the instruction of mothers model maternity outfits could be exhibited at ante-natal clinics when the sisters would give detailed advice. Arrangements could be made to sterilize these kits at the local general hospitals and, as has been shown in New Zealand, the cost of outfit and sterilization need not be excessive. By this means the public would realize the importance of preparing for labour as for any surgical operation.

The main difference between city and rural practice is seen in the actual conduct of labour. Undoubtedly the mental attitude of the public to the subject of labour, particularly in regard to their demands on the profession, has altered in recent years. Want of confidence in their own powers and a knowledge that relief is possible by artificial means all tend to prevent child-birth being a normal function. These facts operate more in Melbourne than in the country and the percentage of artificially ended labours is much higher in the metropolis than in the rest of the State and so also are the deaths from sepsis. The practice of obstetrics is arduous and underpaid and often causes much interruption to the routine of a busy general practitioner. He is tempted to terminate a case as soon as possible with forceps and generally such interference is welcomed by the importunate relatives demanding immediate relief. The vicious circle is completed and the conscientious doctor often suffers defeat in the unequal struggle between his obstetrical ideals and the conditions of actual practice. Allowing for this strong pressure of patients and their relatives to terminate labour quickly, the profession is not absolved from blame. In far too many instances no correct diagnosis of the presentation is made, the rules for the application of forceps are ruthlessly broken and if at first unsuccessful strength is substituted for an investigation of the cause of obstruction. The records of the Women's Hospital amply illustrate the tragedy of the "failed forceps" in the causation of maternal and infantile mortality. Those who are proud of their manual dexterity, do not realize the influence they exercise over the younger men who are tempted to cast aside their ideals because the senior breaks all the rules with apparent immunity. Much of this criticism applies to the industrial suburbs and some of the residential areas of Melbourne. The work is mainly done in the smaller type of hospital or with poor grades of nurses, when the results are not open to professional inspection and criticism. The influence of the larger hospitals in preventing unnecessary interference and bad work is a strong argument for the establishment of larger units to replace these small alleged hospitals.

Adequate ante-natal supervision associated with a good hospital or a well trained nurse *plus* the judicious use of sedatives will decrease the incidence of artificial delivery. This is proved in the records of St. George's and Bethesda Hospitals in Melbourne, by the work of the Bush Nursing Association and in the records of many practitioners throughout the State.

No definite figure can be laid down as to what constitutes a fair percentage of forceps deliveries. The conditions of hospital and private practice are not comparable. In New Zealand, where records must be kept for hospitals, the average rate for 1926 was 13.7%. No such estimate

can be given for Victoria. In private practice under present conditions any rate under 30% must be regarded as not unreasonable. The incidence varies directly with the size of the locality. It is low in the smaller country centres, increases rapidly in the larger towns and reaches its zenith in Melbourne.

TABLE XXI.—INCIDENCE OF FORCEPS APPLICATIONS ACCORDING TO SIZE OF TOWN.

Population.	Under 10 %.	10-30 %.	30-50 %.	Over 50 %.	Total Doctors Inter- viewed.
Under 500 ..	36	9	8	—	53
500-1,000 ..	38	23	9	5	75
1,000-2,000 ..	21	38	7	5	71
2,000-5,000 ..	2	36	26	10	74
Principal Country					
Towns ..	4	15	18	19	56
Melbourne ..	13	97	117	95	304
WHOLE STATE	114	218	167	134	633

If this be expressed as a percentage of the total number of doctors interviewed it will be seen that the proportion under 30% for Melbourne is approximately only half that of the rest of the State.

TABLE XXII.—INCIDENCE OF FORCEPS APPLICATION EXPRESSED AS PERCENTAGE OF DOCTORS INTERVIEWED

Percentage.	Melbourne.	Rest of State.
Under 10 %	4	31
10-30 %	32	37
30-50 %	33	20
Over 50 %	31	12
TOTAL	100 %	100 %

In Melbourne this increased proportion is noted more in the industrial than the residential suburbs.

TABLE XXIII.—INCIDENCE OF FORCEPS APPLICATION, MELBOURNE

Percentage.	Industrial Suburbs.	Residential Suburbs.
Under 10 %	3	4
10-30 %	22	46
Over 30 %	76	50
TOTAL	100 %	100 %

Those who use forceps as a routine, defend their attitude mainly on three grounds: (a) That the perineum is preserved and not damaged, (b) that no increased morbidity results and (c) that the foetal death rate is unaffected. Others are not so sanguine and admit that any interference, including low forceps, must carry an added risk. This is confirmed by the records of the two intermediate hospitals in Melbourne as well as by the autopsy results previously quoted.

Excessive artificial delivery is therefore a most important factor in the problem of maternal morbidity, especially in the metropolitan area.

Pituitary extract is not employed as much as formerly and 60% of the doctors interviewed reserved its use for complications during and after the third stage of labour.

The conduct of the third stage of labour is a valuable criterion of the obstetric standards of any practitioner. On the whole it is fairly well managed by most men, although those who favour rapid delivery, are not inclined to adopt different measures during this important stage.

TABLE XXIV.—COMPARISON NORMAL AND FORCEPS CASES REGARDING PERINEAL LACERATION AND MORBIDITY.

Method of Delivery.	St. George's.	Bethesda.
Total cases	996	1,955
Normal delivery	764	1,778
Forceps delivery	232	177
Normal delivery:		
Percentage with perineal lacerations	38 %	29 %
Percentage morbid	6 %	4.7 %
Forceps delivery:		
Percentage with perineal lacerations	65 %	65 %
Percentage morbid	11 %	7 %

Puerperal Sepsis.

Approximately one woman in five hundred dies from puerperal sepsis. It has already been shown to be the most important cause of death following child-birth and also that the rate is increasing, especially in Melbourne. Exception has been taken to the inclusion of septic abortions in estimating the rate, but, even if they be excluded, this progressive increase is still noted.

The utter failure of notification of puerperal fever in Victoria, either as an index of its prevalence or as a means of insuring early treatment, is illustrated by the returns of the last five years; 205 cases were notified and 266 deaths were registered. This result is due to several factors. In the first place there is no accurate definition of the term. Any febrile condition in a puerperal woman associated with inflammatory conditions of the pelvic organs should be considered to be due to sepsis, whether there be other foci in the body or not. Pyrexia during the puerperium is not insignificant and it is often forgotten that a mild degree of infection, if transmitted to other women, is liable to cause a virulent outbreak. This was illustrated in recent outbreaks in Melbourne. Although the midwives' regulations require the notification of all elevated temperatures, it was not until the inspectress began duty, that this regulation was carried out to any extent. It is recommended that this regulation be amended to include abortions as well as full term labours and also that all such temperatures be reported both in hospital and private practice. It must be clearly understood that this is not the same thing as notifying puerperal sepsis. Probably 50% of the pyrexia would be extra-genital in origin and the true cases of sepsis will still require further notification. But it would insure that all cases were investigated at the earliest moment with a consequent saving of many extra lives.

To overcome another difficulty, such notification should be made direct to the Health Department in Melbourne or to the district health officer in the country and not to the local authorities. With the latter procedure discussions have been known to occur at council meetings and be reported in the press. Such publicity and often erroneous criticism invariably reacts against the doctor and only results in non-notification. The public must adopt a more reasonable attitude, for in the present state of our knowledge the medical attendant is not necessarily always to blame.

Notification is useless unless the authorities are prepared to assist the doctor to arrive at a correct diagnosis. In the country districts bacteriological examination of blood and secretions can be carried out at the Federal laboratories or at those attached to base hospitals. In Melbourne this could be best accomplished by the provision of adequate laboratory facilities at the Women's and Queen Victoria Hospitals. Consultants could be appointed at various centres and would be available for advice at a fixed fee paid by the State for those unable to afford full private rates; in most cases such expenditure could be recoverable from the patient. Since septic patients should be nursed in hospital and not at home, suitable isolation accommodation must be rendered available at the main centres.

The district health officer should personally interview the doctor in every case of sepsis, but inspection of the hospital or nurse could be left to the inspectress.

The present regulations regarding disinfection of the room and isolation of the nurse until certified fit to resume duty are sufficient. There is, however, no clause which forbids the admission of new patients while a patient with sepsis is still under treatment in hospital. There is no necessity to close a hospital completely unless the outbreak of sepsis is serious.

From personal investigation of a number of deaths it was found that the majority was traceable to some obstetric procedure or failure of aseptic technique during labour on the part of the doctor. In a few cases the nurse was to blame; one such case was due to an infected antrum and others to septic fingers. The patient herself was responsible only in a few instances.

Both the public and the profession must realize that the solution of the problem involves three main factors: (i) More thorough ante-natal supervision and elimination of septic foci; (ii) more intensive instruction of students so that they will be able to recognize abnormalities in time and determine the correct treatment and (iii) more time spent over delivery in proper surroundings with good nurses. Of these requirements a sound knowledge of the fundamentals of obstetrics is of more importance even than improved hospital accommodation.

The Maternity Allowance.

Whether or not the object of the *Maternity Allowance Act* was to lessen maternal and infant mortality, it is certain that it has failed to achieve this result. Stress has been laid in this report on the importance of maternal care during the pre-natal period, the need for improved professional knowledge and better hospital facilities. The use of even a portion of the large sums spent annually on the baby bonus would materially assist these objectives. The recommendation of the Royal Commission on Health, namely, that proof of adequate ante-natal supervision should be furnished before payment of the allowance, has been completely ignored. Maternity benefits form part of the proposed scheme of national insurance and will be paid in addition to the present allowance. This will afford the Government another opportunity of insisting on proper medical and nursing attention in a suitable environment. There are many problems requiring further research which cannot be undertaken until funds are available. Therefore it is time that both the politician and the general public realized that continuance of the present scheme does not lead towards any material benefit to the nation.

Summary.

In Victoria during the past five years 869 mothers have died during child-birth and approximately 11,000 still-births and deaths of infants under one month have also occurred. The maternal mortality is not decreasing and the rate for 1927 is the highest for the past twenty-two years. The still-birth rate remains constant and the infant mortality under one month shows no signs of diminution. All these losses are excessive in Melbourne as compared with the rest of the State.

Puerperal sepsis is the most important factor in this mortality and is largely caused by much unnecessary interference with normal delivery.

Owing to their indifference to the value of ante-natal supervision and a proper environment for labour, as well as by their insistence on rapid delivery regardless of the consequences, the public must bear a share of the responsibility.

The few members of the medical profession who are inefficient, are mainly responsible. But the figures quoted in this report make it evident that an improvement in results can be achieved only when the whole body of the profession apply in their obstetric practice the lessons to be learnt from the present state of affairs. A contributory cause is afforded by the inadequate preliminary training of medical students.

Finally, this investigation is a sign to the public that the medical profession is concerned with the situation and

is anxious for improvement. Therefore it expects support from an aroused public conscience in the initiation of future reforms.

The reason for dwelling upon the tragedy of an unnecessarily high maternal mortality rate is not for the sake of criticism or censure, but because, until it is realized that much of the poignant sorrow and suffering caused by misadventure at the time of child-birth is not inevitable and can be lessened, we shall be slow to find the time, money, effort and good will needed to persuade all concerned to combine and overcome the practical difficulties of this problem.

—Dame Janet Campbell.

Recommendations.

1. The establishment of a Chair of Obstetrics at the University of Melbourne. More prolonged and intensive training of the student.

2. The formation of ante-natal clinics at every centre where facilities exist.

3. The erection of modern maternity units, especially in the metropolitan area, to replace the present system of nursing homes.

4. Encouragement of trained nurses to undertake obstetric service. Necessary factors in this are the elimination of partially trained and untrained women and the institution of refresher courses and pensions.

5. Minimum standards governing the preparations for delivery to be published and enforced both in hospital and private practice.

6. Compulsory notification of all cases of puerperal pyrexia.

7. Provision of ample facilities for laboratory diagnosis, advice by consultants and hospital accommodation.

8. Death certificates to show the association of pregnancy or child-birth with the cause of death; investigation of all maternal deaths; notification of still-births; legal power for the Statistician to obtain additional information from medical practitioners concerning doubtful certificates.

9. That immediate steps be taken to give effect to the recommendations of the Federal Royal Commission on Health (1926) regarding maternity hygiene.

PART III.

CLINICAL AND LABORATORY INVESTIGATIONS.

The clinical and laboratory investigations have been directed along two main lines: (i) A study of the problems associated with the bacteriology and treatment of puerperal sepsis. This was undertaken by Dr. E. R. White at the Women's Hospital in association first with Miss F. E. Williams who had to resign owing to ill-health, and later with Dr. Lucy Bryce at the Walter and Eliza Hall Research Institute. Since 1927 the staff of the Queen Victoria Hospital have rendered valuable assistance by supplying additional clinical material.

The value of "Mercurochrome" in the treatment of puerperal sepsis was thoroughly investigated by Dr. E. R. White. Unfortunately it did not fulfil the expectations aroused by some initial successes.

Dr. Lucy Bryce in addition to the examination of cultures from febrile puerperal patients, has made a detailed study of the bacteria found in the genital passages during pregnancy in order to note whether the standards accepted in other countries are applicable to local conditions. Valuable work was also performed by her in the bacteriological investigation of several outbreaks of sepsis in private hospitals.

(ii) A study of the toxæmias of pregnancy was undertaken. An attempt was made to correlate the results of bio-chemical examination of blood and urine with clinical observations. This was carried out by Dr. John S. Green and Miss Vera Kreiger, M.Sc., in collaboration with Associate Professor J. W. Young, of the Bio-chemical Department of the University of Melbourne. They have shown that such tests possess a practical value in the

estimation of permanent damage to the liver and kidneys, in the control of treatment and in prognosis. The extent of the work which has been accomplished is proof of the industry and enthusiasm shown by all concerned. It is therefore pleasing to note that the Committee of the Women's Hospital have appointed Miss Kreiger to the staff of the hospital, thus insuring continuance of the present work.

Brief summaries of the conclusions arrived at in both investigations are contained in this section of the report. The complete work will be published in THE MEDICAL JOURNAL OF AUSTRALIA at an early date.

It must be recorded that the investigations have been conducted under great disabilities owing to the absence of sufficient laboratory accommodation at the Women's Hospital. Considerable delay and extra work was incurred in transporting specimens to two laboratories in different parts of the city. The lack of foreign literature for necessary references has also been a serious drawback.

Research has not played a prominent part in obstetrical work in Australia, mainly owing to lack of funds and opportunities. Much good material is being wasted at present and will continue to be wasted until provision is made for adequate laboratory facilities at the main clinical centres.

I desire to express my appreciation of the efforts of those coworkers in this research to whom reference has already been made and to the manner in which the committees and honorary medical staffs of the Women's and Queen Victoria Hospitals have granted every request for assistance. For much helpful criticism and advice I wish especially to thank Dr. C. H. Kellaway, Director of the Walter and Eliza Hall Research Institute.

SUMMARY OF BACTERIOLOGICAL INVESTIGATIONS IN CONNECTION WITH PUEPERAL INFECTION.

By Lucy M. Bryce, M.B., B.S., B.Sc.,
(Walter and Eliza Hall Research Institute,
Melbourne).

These investigations are grouped under five headings.

1. A study of the organisms found in the vagina and uterus in fifty cases of fever following abortion or child-birth, in patients admitted to, or delivered in, the Women's Hospital. The bacteriological examinations of numbers 1 to 34 of this series were made by Miss F. E. Williams, who unfortunately was subsequently compelled to relinquish the work through ill-health. The swabs were taken by Dr. E. R. White. The findings from these patients were compared with those from the cervix and uterus in twenty-nine afebrile puerperal patients from the second series.

2. An investigation of the bacterial content of the genital passages during normal pregnancy, in order to compare it with that of the puerperium and to correlate it with the clinical course of the puerperium and thus assess the importance of the preexisting vaginal flora in relation to puerperal sepsis.

Researches on these lines have been carried out many times in other countries, with varying, sometimes conflicting results, but so far none has been published in Australia. It was felt that differences due to local hygienic conditions or variations in immunity might be revealed by such an investigation here.

One hundred and nineteen patients were examined. Eighty-six were attending the ante-natal clinic at the Women's Hospital and from these the swabs were taken by Dr. E. R. White. Later, thirty-three patients at the Queen Victoria Hospital were examined by the author in cooperation with the Medical Superintendent, Dr. Isabel Ireland, and her successor, Dr. Margaret Ashton. The subsequent history of one hundred and three of these patients was available and has been considered in relation to the bacteriological findings.

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Thirty patients (fourteen at the Women's and sixteen at the Queen Victoria Hospital) from whom swabs had been taken before delivery, were further examined during labour and the puerperium. The organisms found at these different times were noted and, as mentioned above, comparison made between the findings in febrile and afebrile cases.

As the examination of patients in this way is a slow process, the numbers in these two series are small and so do not permit many definite conclusions to be drawn.

The first series indicates, however, that a variety of organisms, of which streptococci are the most important, may be concerned in the production of puerperal fever and that therefore the cooperation of the bacteriologist with the clinician is essential, especially if specific treatment is contemplated. The modern trend is to control any form of treatment by estimation of changes occurring in the patient's blood which indicate increase or decrease of bactericidal power and other forms of resistance to the infection. The virulence of potentially pathogenic organisms is being minutely studied in other countries by bacteriological methods such as the Ruge-Phillip and similar tests.

The second investigation shows that examination of the vaginal secretion during pregnancy may be of practical value from the following aspects: (i) It gives an indication of the personal hygiene of the patient and the influence of this on puerperal morbidity may be studied; (ii) potentially virulent organisms are occasionally found. Further observations may be made on these and knowledge gained of their mode of entry, their subsequent behaviour and the clinical course of the puerperium; (iii) unsuspected diseases, such as chronic gonorrhœa, may be occasionally detected and their consequences averted.

Dr. C. H. Mollison kindly presented a number of cultures from blood and other sources obtained from patients at the Women's Hospital. These cultures gave further opportunity to study the organisms met with in puerperal sepsis.

Enumeration of the types of organisms found in these series and discussion of the bacteriological problems encountered will be published later.

Investigations, involving extensive bacteriological work, were made into two outbreaks of puerperal sepsis occurring in private hospitals. The detection of a carrier in one of these is described in THE MEDICAL JOURNAL OF AUSTRALIA of March 31, 1928.

The production of soluble toxins, analogous to those produced by scarlatinal strains, was demonstrated in the case of streptococci isolated from patients with puerperal sepsis. Filtrates were made with six strains and it was found possible to obtain intradermal reactions similar to those obtained in the Dick test in a certain proportion of all individuals tested, including pregnant and puerperal women. Dr. Helen Kelsey kindly made filtrates of two of these strains and tested them on patients at the Infectious Diseases Hospital. They gave reactions of similar type to those which she had previously obtained with her scarlatinal strains. Evidence is accumulating which demonstrates the high curative value of anti-scarlatinal serum containing an antitoxic element. It is possible that a similar method of treatment might be of value in a streptococcal puerperal infection.

Difficulties Encountered in These Investigations.

There is splendid clinical material at the Women's and Queen Victoria Hospitals, but unfortunately both at present lack laboratory equipment. All bacteriological work has therefore been done at the Walter and Eliza Hall Institute. Although excellent facilities were thus made available, this procedure caused much waste of time and made close correlation of clinical and laboratory observations very difficult.

Owing to the dearth of German and Austrian journals available in Melbourne, it has been impossible to refer to much of the previous work on the vaginal flora which has been done in these countries. The publications most frequently required were *Archiv für Gynäkologie, Monats-*

schrift für Geburtshilfe und Gynäkologie, Wiener Medizinische Wochenschrift and the *Zentralblatt für Gynäkologie*.

Acknowledgements.

The cooperation of the honorary and resident medical staff at the Women's and Queen Victoria Hospitals has been much appreciated. I particularly wish to thank Drs. C. H. Mollison, Yoffa and Bearham at the former, and Dr. S. Isabel Ireland, Dr. Margaret Ashton and other members of the resident staff of the Queen Victoria Hospital and Dr. Marion Wanless, who obtained in Vienna journals not available in Melbourne.

OBSERVATIONS ON THE CHEMISTRY OF BLOOD AND URINE IN THE TOXÆMIAS OF PREGNANCY.

By John S. Green, M.D. (Melbourne), D.G.O. (Dublin), Honorary Obstetric Surgeon, Women's Hospital;

and

Vera I. Krieger, M.Sc.,
Bio-chemical Department, University of Melbourne.

For a period of nineteen months the chemistry of blood and urine in the toxæmias of pregnancy has been investigated. The importance of this subject is illustrated by the statistics of the Women's Hospital. Of all the deaths (214) occurring in the obstetric department of the Hospital for the period 1920-1925, 74 or 35% were caused by the toxæmias of pregnancy.

This investigation involved the performance of 3,290 tests, 2,000 of which were quantitative estimations.

The results have been presented and discussed under various headings: tabulation of findings, discussion of individual tests, clinical types and their findings, value of individual tests, clinical application to treatment and prognosis.

The following conclusions have emerged from the work:

1. Chemical investigation of the toxæmias of pregnancy has a very definite interest for the obstetrician.

2. From the aetiological point of view every case independently of grouping has potentially three factors: (i) purely toxic (? hepatic), (ii) renal, (iii) preexisting nephritis.

3. The most satisfactory grouping of cases is a clinical one. An elaboration of types is unnecessary and confusing. A fairly complete chemical picture has been worked out for each type.

4. Individual cases should be viewed broadly according to the grouping, using the chemical findings as a fine adjustment. This applies practically as well as academically.

5. For practical purposes renal impairment is more significant than hepatic. The most valuable tests are the urea concentration, the blood urea, the Fouchet test.

6. In the treatment of a "new case" chemical findings may be outweighed by clinical judgement, but not lightly if the chemical findings are unsatisfactory. When the past history of a patient is bad, great deference must be paid to the chemical findings.

7. From the point of view of the subsequent history and possible pregnancy, defective responses to renal tests are very sinister. This is a consideration in immediate treatment.

Reviews.

BACTERIOPHAGY.

A FURTHER addition to previously published works on the phenomenon of bacteriophagy has been produced by d'Herelle under the title of "The Bacteriophage and Its Behaviour."¹

¹ "The Bacteriophage and its Behaviour," by F. D'Herelle, M.D., translated by George H. Smith, Ph.D.; 1926. Baltimore: The Williams and Wilkins Company. Demy 8vo., pp. 643. Price: \$8.

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The work is offered in three parts. Part I deals with the phenomenon of bacteriophagy and nearly three hundred pages are devoted to it. Part II, on the properties of the bacteriophage, consists of one hundred pages and in Part III the behaviour of the bacteriophage probe is discussed in two hundred pages. The whole is preceded by an introduction in which d'Herelle again describes, this time briefly, what is meant by the phenomenon of bacteriophagy and reviews other work which may be construed as dealing with the phenomenon. He again disclaims any connexion between the Twort phenomenon, referred to by him as bacteriolysis, and the phenomenon of bacteriophagy. The technique to be used in bacteriophage experiments is also described.

Much of Part I dealing with the phenomenon of bacteriophagy has already appeared before in d'Herelle's previous work. Confirmation of the author's experimental work by other investigators is cited. Evidence that the bacteriophage principle exists in the physical state of individual "corpuscles" is given and also that reproduction of the bacteriophage in the body of the parasitized bacterium occurs by the formation of a colony of a number of elements. Rupture of the bacterium occurs suddenly and liberates into the medium the new corpuscles which are then ready to continue the action. The rate of multiplication of the bacteriophage (probes) depends on the number of bacteria capable of being bacteriophaged. Variation in virulence of the bacteriophage and the resistance of bacteria to its action are also discussed and finally a description of the bacteria susceptible to the phenomenon is given.

In Part II the author deals with the properties and nature of the bacteriophage and in considering the latter he offers criticism of the various other hypotheses regarding the nature of the principle. D'Herelle classifies the bacteriophage among what is described as the "protobes," a homogeneous group manifesting elementary life placed at the bottom of the two kingdoms, animal and vegetable, from which are derived by a simple phenomenon of aggregation or synthesis on the one hand the protophytes and on the other the protozoa. Perhaps it is d'Herelle's more extensive knowledge of the principle which enables him to affirm that "the fact that there is such a being as protobios bacteriophagus permits us to approach in a scientific way the problem of the origin of life."

Part III, on the behaviour of the bacteriophage probe, contains first of all a consideration of the bacteriophage as an antigen. Experiments of Bordet and Cinca are cited. The conclusion to be drawn from these according to d'Herelle is that the bacteriophage functions as a specific antigen and one that is not found in normal bacteria. Proof of this is found in the fact that injections of bacteriophage suspensions result in the appearance in the serum of the injected animal of an antibacteriophage property. According to Otter, Munter and Winkler the intensity of the antigenic properties of different races of the bacteriophage is highly variable.

The antibacteriophagic properties of serum do not act by destroying the bacteriophage when the two are brought into contact. The effect is an inhibition of action. The author next deals with the ubiquity of the bacteriophage probe. Its absence from the intestinal tract of the fetus and new born infant is stressed, but apart from this it is stated to be present within the intestinal tract of every man and animal, where it lives in symbiosis with *Bacillus coli* and other normal bacterial inhabitants. Its virulence in normal man is restricted to the strain with which it is in symbiotic relationship. Its presence can be shown in everything which under natural conditions has ever been exposed to pollution by excreta.

In considering the behaviour of the bacteriophage in disease d'Herelle asserts that infection in man of any sort is overcome by the bacteriophage. In disease the latter does not remain confined to the intestine. It passes from there to the circulation and tissues and so comes in contact with the infecting bacteria. The subsequent course of the disease depends on the behaviour of the bacteriophage to the invading organism. If conditions are favourable, the latter is overcome, bacteriophagy results and the disease disappears. This may occur slowly or rapidly

according to the time taken for the virulence of the bacteriophage to increase sufficiently to bring about bacteriophagy. Since the bacteriophage lives in the intestine in symbiosis with *Bacillus coli*, infection with ordinary strains of this organism, that is, strains not resistant to the bacteriophage, should not occur. D'Herelle points out that these ordinary strains are not pathogenic and that when infection with this organism does occur, it is with resistant strains only. Bacteriophagy occurs in man with the resultant elimination of the invading organism in such diseases as bubonic plague, dysentery, typhoid fever and in staphylococcal and streptococcal infections.

Immunity has been produced experimentally by injection of bacteriophage infections and such immunity is of a twofold nature. In the first place there is an initial exogenous immunity due to bacteriophagy of the infecting agent which persists only until such agent is eliminated from the body. In a contaminated environment where reinfection frequently occurs, for example, in the epidermis, this exogenous immunity persists as long as reinfections occur. In the second place there is an endogenous immunity due to a reaction on the part of the body, the stimulus being provided by the products of bacterial dissolution in the bacteriophage suspension. This endogenous immunity persists for some months.

Therapeutically the bacteriophage has been used in a number of cases of infectious disease of different types and the results of studies show that in the bacillary dysenteries and in staphylococcal and *Bacillus coli* infections "phagotherapy" represents a specific means of treatment for these infections. The author hopes that shortly plague will also be included in the infections that can be so treated.

The principles enunciated by d'Herelle are of great importance in the study of immunity and evidence appears to be gathering in favour of his assertions. The book, like its predecessors, suffers somewhat in being a translation and also from the fact that d'Herelle is so enthusiastic and so anxious to prove his points that he is at times apt to offer in support too much extraneous matter. This at times somewhat bewilders the reader and results in too much reading matter being presented.

There is a great "sameness" about all d'Herelle's works on this subject and his fault of repetition is still manifest.

RÉSUMÉ OF OTO-RHINO-LARYNGOLOGICAL PROGRESS.

THE PRACTICAL MEDICINE SERIES (Eye, Ear, Nose and Throat) consists in the main of a series of papers in which most of the affections of the eye, ear, nose and throat are discussed.¹ These papers have been ably selected by the editors and their comments on the opinions, findings and results of the various observers are to the point, logical and illuminating. The results of treatment in various contentious conditions are frequently given, for example the relation of asthma to nose and throat surgery is discussed and figures relating to a large number of patients seem to show that only a small minority had their asthmatic paroxysms stopped as a result of nasal surgery when definite nasal trouble existed in conjunction with the asthma. Again, figures are given showing the results of tonsillectomy in nephritis. As a result of the series of patients observed the conclusion was that definite benefit does not follow tonsillectomy in subacute or chronic nephritis.

The book is of little use to the general practitioner, but it should form a most useful adjunct in the library of any man engaged in this special work. It is a book to which he would constantly refer for various additional methods of diagnosis and treatment and for the results to be hoped for by applying these methods. As such it can be recommended to the specialist in these conditions.

¹ "The Practical Medicine Series," Comprising Eight Volumes on the Year's Progress in Medicine and Surgery: Under the General Editorial Charge of Charles L. Mix, A.M., M.D.; The Eye, Ear, Nose and Throat; 1927. Chicago: The Year Book Publishers, Crown 8vo., pp. 526, with illustrations. Price: \$2.50 net.

The Medical Journal of Australia

SATURDAY, JUNE 2, 1928.

A Necessary Investigation.

AN announcement has been made in *The British Medical Journal* of January 7, 1928, that a collective investigation is to be carried out by the Science Committee of the British Medical Association into the after histories of persons subjected to the operation of gastro-enterostomy. It is proposed to approach the practising portion of the medical profession in order to collect information concerning these persons. A series of questions has been drawn up and the replies are to be received by the Medical Secretary. It is unnecessary to point out that surgeons are not of one opinion in regard to the indications for short-circuiting intestinal operations and that there are many who disapprove of the routine performance of gastro-enterostomy in the treatment of gastric or duodenal ulcer, and many who use this operation for almost every gastric and duodenal lesion. It is by no means infrequent for a patient to be compelled to return to his medical attendant or to the surgeon after gastro-duodenostomy or gastro-jejunostomy has been performed either because the symptoms originally complained of have not disappeared or because fresh abdominal symptoms have manifested themselves. It is doubtful whether the surgeon is the best judge of the ultimate results of these operations. Many patients finding that the operation has brought them no relief, prefer to consult someone else or are unwilling to subject themselves again to a similar experiment. The operation of short-circuiting is not a sound procedure from a physiological point of view. Dr. H. B. Devine in an admirable paper read before the second session of the Australasian Medical Congress (British Medical Association) at Dunedin last year, maintains that gastro-enterostomy is performed in duodenal ulcer essentially for the purpose of reestablishing an optimal emptying time. He assumes that the ulcer

is the result of a disorder of what is termed the mechanism of retention. In the very chronic ulcers the gastric secretion is hyperacid. In the less chronic ulcers he postulates a lowering of the local resistance of the tissues. Duodenal ulcer may be produced in these two ways, but it is probable that its pathology is much more complicated and that the restoration of an optimum emptying time merely remedies one of the manifestations of the condition. Dr. Devine expresses the opinion that the effect of gastro-enterostomy is dependent on the gradient of the stomach and therefore on the situation of the stoma. That faulty technique and wrong indications may lead to changes in the stomach or duodenum, including ulcer formation and errors of gastric motility, is admitted by him. His teaching is helpful and very clear, but as the disturbance of the physiological mechanism of the stomach and duodenum is not fully understood, it is necessary to collect as much evidence as possible to verify or to refute the doctrines.

A proposal is being put forward by the South Australian Branch of the British Medical Association to the Federal Committee that this matter should be investigated in Australia and that reports on this inquiry should be presented to the third session of the Australasian Medical Congress (British Medical Association) at Sydney in 1929. The subject has more than academic interest. In order that the medical profession may determine both the correct treatment of gastric and duodenal ulcer and the proper indications, if any, of the operation of gastro-enterostomy, it is necessary to place on record all the facts in regard to a large number of patients subjected to it. In the first place the indications must be clearly established. Every surgeon in the Commonwealth should be asked to intimate the precise signs that have induced him to perform the operation. He should be asked to augment this information by a statement of the immediate and remote effect of the operation in every patient operated on during a period of five or ten years. He should further give the exact situation of the stoma and the other details of the operation. In regard to the results, it is useless to submit the bald statement that a patient has been cured of his ulcer. Full clinical informa-

tion should be given in regard to each patient. The radiographic appearances before and at various periods after the operation should be described; information concerning the gastric secretion, concerning the presence of or freedom from pain and concerning the functions of the gastro-intestinal canal should be offered. In addition to the surgeon's findings, a statement made by the patient three, four or five years after the operation would be of value and should be uninfluenced by the surgeon's views. Lastly a record should be sought from general practitioners concerning the later condition of patients who have undergone the operation. If a few hundred full reports could be obtained, much of the doubt that exists today, would be banished and a saner and truer estimate of the proper place of gastro-enterostomy would be gained. The investigation will be of great benefit to the public if it is conducted without consideration for the reputation of individual surgeons. Names would not be published, but any evidence of bad surgery or of skilled operation applied without sound judgement or reasoned necessity would be disclosed.

The investigation, if it is to be carried out, will demand care, time and energy. Perhaps six or more assessors, preferably not surgeons, acting as a committee, could be found to undertake the work. They would adopt a plan of campaign, so that the method of inquiry might be uniform and the collating of the information might be devoid of preconceived ideas. We trust that this work will be started without delay and prosecuted to a successful issue.

Current Comment.

ECTOPIC CHORION EPITHELIOMA.

THE conception of a variety of malignant disease of the uterine wall known as *deciduoma malignum* owed its origin to both Sänger and Pfeiffer. The name was chosen because the microscopical structure resembled that of decidual tissue. It was Marchand who showed that the tumours arose from the chorionic epithelium and that the epithelial cells produced both the syncytium and the Langhans cells—the polygonal cells with distinct nuclei and cell walls which constitute the inner of the two layers of cells covering the chorion. Ewing states that Marchand's view of the exclusive chorionic origin of the tumours has proved to be entirely correct and has served to connect the various

grades of proliferation of chorionic epithelium in one general class. Ewing distinguishes three main types of chorion epithelioma—*chorio-adenoma destruens* or the destructive placental mole, choriocarcinoma, and syncytoma and syncytial endometritis—but he points out that between these there are many transitional forms. Chorion epithelioma generally occurs in association with pregnancy. Bland Sutton states that chorionic carcinoma arises in portions of the chorionic villi which remain embedded in the endometrium after the expulsion of the main products of gestation and especially if the villi have undergone hydatidiform change. A typical case of this nature was reported in these columns by C. E. D'Arcy in June, 1927. It is well known that chorionic elements may gain entrance into the maternal circulation. In 1904 Schmorl examined the lungs of one hundred and fifty-eight women who had died at different stages of pregnancy or after delivery. He found chorionic cells in the pulmonary capillaries of 80% of the bodies of those whose pregnancies had been normal. Chorion epithelioma may occur, however, when there is no history of pregnancy and in these circumstances many interesting questions of pathogenesis arise. Edmund de Zalka has recently reported two cases of what he calls ectopic chorion epithelioma.¹

De Zalka states that ovarian chorion epithelioma was first reported by Pick and that extra-uterine chorion epitheliomata may be divided into two classes: those associated with pregnancy and those in which chorion epitheliomatous proliferation occurs in a teratoma. He then refers to a recent paper of Bostroem, published in 1927, in which a new interpretation of the origin of chorion epitheliomata is given. According to Bostroem the tumour does not originate from chorionic cells, but rather from mesenchymal endothelial cells, the so-called serotinal wandering cells. It is obvious that if this view were accepted, one of two courses would have to be adopted. Either the conception of the chorionic nature of chorion epithelioma would have to be abandoned or else it would have to be granted that a mesenchymal cell can become differentiated to assume the structure and function of an ectodermal cell. This view has been advanced in explanation of the origin of other neoplastic manifestations, but there is no evidence to justify the assumption of such a possibility. De Zalka regards the serotinal wandering cells as undifferentiated germ cells and believes that they are the basis of all formative changes. He states that according to Marchand when these cells are irritated by humoral influences, they react by proliferation and form so-called primary tumour cells which by a process of amitotic division become syncytial cells, and the latter by further differentiation give rise to Langhans cells. The Langhans cells may undergo but a single mitotic division after which no further cell division occurs. Bostroem believes that the differentiated cells can no longer divide and that

¹ *The American Journal of Pathology*, January, 1928.

they die quite rapidly. In this he sees an explanation of the necrosis commonly seen in the centre of the tumour. Marchand observed that syncytial cells tend to grow in regions adjacent to capillaries and under the endothelium. Bostroem holds that the syncytial cells are formed primarily in these localities, new capillaries proliferate in the vicinity of the tumour and new syncytial cells constantly form from serotinal wandering cells, the tumour thus growing in a certain sense by apposition. Bostroem also thinks that metastases are not products of a primary tumour, but are the result of an irritative action on undifferentiated germ cells in other organs, similar to that causing the primary tumour. In this sense metastases are "sister tumours." De Zalka does not attempt to discuss Bostroem's paper, he states that Bostroem's whole hypothesis has no firm basis and does not justify the abandonment of the present classification of ectopic chorion epitheliomata. He states that in spite of the omnipresence of Bostroem's undifferentiated germ cells several facts remain. In the first place the great majority of chorion epitheliomata develop after pregnancy and especially after hydatid mole. In the second place it is exceedingly rare for chorion epitheliomata to develop in the absence of a previous pregnancy. In the third place the tumours, morphologically resemble chorionic elements. In the fourth place although Bostroem believes that there is no connexion between tumour and chorionic cells distributed by the blood stream, the observations of Nagy and of Schmorl (already referred to) do not support this view.

The first tumour reported by de Zalka occurred in a woman aged twenty-six years. At *post mortem* examination metastatic nodules were found in the skin, lungs, kidneys, liver, pancreas, brain and left temporal bone. The left ovary was affected by the tumour. Its greater part consisted of necrotic tissue and in the periphery of the tumour mass the tissue resembled that ordinarily found in chorion epithelioma. No ovarian tissue remained and there was no suggestion of teratoma. In the opinion of de Zalka there are three possibilities in regard to the nature of this tumour. The first is that chorionic elements were deposited in the left ovary, liver, lungs and other organs without the existence of a primary uterine tumour and that these deposits have given rise to multiple growths. The second is that a primary uterine tumour produced metastases and thereupon either became healed or was expelled. The third is that the ovarian tumour is primary and the other nodules metastatic. The first of these possibilities is regarded as unlikely, since it is difficult to imagine that so many deposits of chorionic material would give rise to tumours. Absence of tumour tissue in the right ovary is one of the main reasons for exclusion of the second possibility, but at the same time it is admitted that this supposition cannot be definitely excluded. In view of the fact that the ovarian tumour mass was single, discrete and encapsulated and was the only genital manifestation of a characteristically genital neoplasm, it was

regarded as the primary tumour. As a primary ovarian tumour it might have originated after pregnancy like an ectopic chorion epithelioma, as a one-sided development of a teratoma or in connexion with an ovarian pregnancy. No evidence of teratoma or of ovarian pregnancy was found and the tumour was, therefore, regarded as a primary chorion epithelioma following a previous pregnancy.

In the second case described by de Zalka the liver was considerably enlarged and contained huge masses of tissue which on histological examination were found to have a histological picture typical of chorion epithelioma; the nodules varied from one to seven centimetres in diameter. No primary genital tumour was discovered and small metastases were observed in the lungs and the left kidney. No signs of teratoma were found. It was concluded that the tumour was an ectopic chorion epithelioma, caused by the transportation in a retrograde manner of chorionic elements through the inferior *vena cava*.

The interest in the two cases reported by de Zalka is twofold. In the first place there is the question of the nature of the two tumours and in the second place the author opens up the whole question of the origin of chorion epitheliomata. In regard to the first aspect it may be stated that de Zalka has brought additional evidence to show that tumours resembling chorion epitheliomata may have no evident connexion with the uterine wall. Whether his diagnosis is correct in each instance is of secondary importance, though it will be admitted that his arguments hold together in a logical fashion. The question of the origin of chorion epitheliomata is of much more serious import. The recognized facts are that the clinical picture of chorion epithelioma associated with the uterus, such as that reported by D'Arcy, is well known. It is also known that chorionic cells are frequently transported to other parts of the body, even in normal pregnancy. There is no knowledge, however, of the conditions which would cause the transported cells to take on an independent growth. It is not inconceivable, though not likely, that the uterine focus might disappear and that transported cells might take on a power of growth. This would explain some ectopic chorion epitheliomata. The question of teratomata has to be considered. It may well be asked whether it is correct to apply the term chorion epitheliomata to tumours which have arisen from degenerated teratomata. Tumours may be found in the male arising from the testis and these are morphologically similar to chorion epithelioma in the female. To apply this term to them would be wrong. If it could be shown that the view of Bostroem was correct, the name chorion epithelioma would have to be discarded, but, as already pointed out, there is at present no justification for the acceptance of this suggestion. At the present time it is wise to conclude that the term ectopic chorion epithelioma should be reserved for those tumours whose relationship to the uterine tissues can be justly inferred. Some other name, such as malignant teratoma, might be used for the others.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

The Vulnerability of the Sixth Cranial Nerve.

E. WOLFF (*British Journal of Ophthalmology*, January, 1928) offers an explanation why the sixth nerve is so vulnerable, why it is affected by so many intracranial conditions and why its localizing value is so small. The sixth nerve is usually regarded as having a long antero-posterior course, a fallacy arising from the fact that the brain is usually removed before the whole course of the nerve is studied. It emerges from the brain between the pons and the lateral part of the pyramid, runs upwards, forwards and slightly outwards. Under the *dura* it runs almost vertically up the back of the apex of the petrous portion of the temporal bone and bends forwards almost at a right angle over the sharp upper border of this bone. Intracranial pressure from a tumour in any position of the brain will force the latter downwards towards its largest opening, the *foramen magnum*. The sixth nerve will therefore be pressed against the sharp upper border of the temporal with resulting palsy of the external rectus. Blows on the vault of the skull, apart from basal fractures, will act in the same way. A similar condition obtains in compression of the skull in difficult labour with or without forceps and in this way sixth nerve birth palsy may be explained.

Colmatage in the Treatment of Detached Retina.

J. A. VAN HEUVEN (*British Journal of Ophthalmology*, December, 1927) relates his experience with colmatage devised by Felix Lagrange as an efficacious and harmless remedy in cases of detached retina. The treatment consists in making a triple row of punctures with a galvano-cautery in the sclerotic after first loosening the conjunctiva round the cornea. The conjunctiva is then replaced and fixed by means of a suture. According to Lagrange the intraocular tension in detached retina is low and after colmatage the tension is raised and the retina is once more pressed down against the wall of the eye. Lagrange attributes the raised tension to the cicatrization at the cauterized spot forming a constricting ring where the fluid in the eye normally escapes. The author agrees that colmatage is followed by raised tension; his experiments on rabbits proved that after an initial slight fall for a few hours there is considerable rise which lasts for at least six months. His explanation of the rise in tension, however, differs from that of Lagrange; he attributes it to the hyperæmia which follows the operation. Experience of the treatment in fifteen eyes convinced him that favourable results must not be expected if the condition

is of long duration or in those associated with high myopia. In the most favourable cases, those of traumatic origin, the prognosis after colmatage is better than after the usual conservative therapy. The reattached retina remains united. Without exception the tension is raised and in no case has any harm resulted.

Removal of Lead Shot from Eyeball.

G. H. CROSS (*Archives of Ophthalmology*, November, 1927) relates the history of a man of fifty-seven who was shot in his only eye. Radiological examination revealed a number six lead shot down and behind in the vitreous. After several attempts a special forceps was devised, a cross action forceps of gauge eighteen German silver wire; the ends were flattened and put in the form of a circle to fit the shot. Local anaesthesia was used and the patient was placed on the fluoroscopic table so that the two beams of light crossed at the foreign body. The forceps were introduced through a scleral incision. The speculum was removed and the assisting radiologist directed the position of the tips of the forceps. With the second attempt the shot was caught and extracted.

Treatment of Cyclo-Iritis After Cataract Extraction.

G. H. BURNHAM (*Canadian Medical Association Journal*, January, 1928) discusses the treatment of cyclo-iritis following cataract extraction. He recommends the daily hypodermic injection of pilocarpine in doses of eleven to eight milligrammes (one-sixth to one-eighth of a grain) and the internal administration of mercury and the iodide and bromide of soda. He refers to a patient whose condition did not improve with the usual atropine treatment, but responded quickly to the combined method.

Local Anaesthesia in Ophthalmic Surgery.

C. S. O'BRIEN (*The Journal of American Medical Association*, January, 1928) describes the methods of obtaining local anaesthesia in eye operations. Peripheral nerve block is often preferable to infiltration. To block the supraorbital nerve, it must be injected as it comes through the notch or foramen. This lies 2.5 centimetres from the mid-line of the face, at the junction of the inner and middle thirds of the supraorbital margin. The infraorbital nerve may be injected in the infraorbital foramen; this lies five to ten millimetres below the infraorbital tubercle which can be felt on the orbital rim over the zygomatico-maxillary suture. It lies 2.5 to 3.0 centimetres from the mid-line. The needle is inserted at the side of the ala of the nose, pointed upwards and outwards towards the outer canthus and forced through to the bone. The foramen is located with the needle, the latter is forced into the canal for five millimetres and one to two cubic centimetres of solution are

injected. The supratrochlear or the infratrochlear nerve may be blocked by injecting directly above and below the pulley of the superior oblique muscle. This lies about one centimetre behind the orbital rim in the upper inner angle of the orbit. To inject this region the bony upper and inner orbital wall should be followed to a depth of 1.0 to 1.5 centimetres. The lachrymal nerve emerges slightly above the external canthus. The notch may be located at the zygomatico-frontal suture. An injection down to the bone in this region and just within the orbital rim behind the tarso-orbital fascia will block the lachrymal nerve. The zygomatico-facial nerve must be blocked by an injection lateral to the junction of the floor and lateral wall of the orbit. To infiltrate the region of the ciliary ganglion and block the ciliary nerve, a needle of fifty millimetres is inserted in the lower fornix between the external and inferior rectus and directed towards the apex of the orbit. The ciliary ganglion lies about fifteen millimetres behind the eyeball between the internal rectus and the optic nerve. To prevent squeezing of the eyelids injection is best made at the anterior margin of the parotid plexus. The point is just anterior to the tragus of the ear and directly over the condyloid process of the mandible. When the needle is inserted straight inwards, it strikes the condyle at a depth of one centimetre. Lid paralysis appears in from thirty to sixty seconds.

Diphtheria Antitoxin and Sympathetic Ophthalmia.

E. B. HECKEL (*Archives of Ophthalmology*, January, 1928) relates the history of four patients, suffering from sympathetic ophthalmia, who were treated with diphtheria antitoxin. He states that sympathetic disease may take the form of an anterior general uveitis with occlusion of the pupil or of a posterior uveitis, better described as a neuro-retinitis. The first patient was a man of twenty-eight, with sympathetic inflammation twenty-eight days after the removal of the injured eye. A picture of well defined neuroretinitis was seen. He was treated with five doses of 3,000 units of diphtheria antitoxin. Vision returned to $\frac{20}{200}$. The second patient was a lad of nineteen, the injured eye was removed five weeks after injury and he returned for treatment of the other eye four months later. After the usual treatment with mercury he was given massive doses of diphtheria antitoxin up to 20,000 units for several days. When the author last saw him the vision was $\frac{20}{200}$. The third patient was a girl of six. The left eye was removed fifteen months after injury and after sympathetic inflammation had occurred in the right eye. Treatment with diphtheria antitoxin resulted in some useful sight. The fourth patient was a boy of eleven. Removal of the injured left eye was refused. Fourteen months later he had had anterior uveitis in both eyes. He was given 20,000 units for five

days. The right eye improved.

LARYNX.

A. M. DECEMBER, 1927
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days. The result was vision of $\frac{1}{200}$ in the right eye and light perception in the left.

LARYNGOLOGY AND OTOTOLOGY.

The Pathology of Atrophic Rhinitis.

A. MALHERBE (*La Presse Médicale*, December 24, 1927) discusses the pathology of atrophic rhinitis. Among the many theories advanced as to causation he favours that of bacterial infection. The bacterial flora found in the crusts is a very varied one, but the most constant is the paradiaphtheritic bacillus of de Belfante. This bacillus is in the author's opinion the causal organism. Originally successful treatment was carried out with anti-diphtheritic serum, but the frequency of anaphylactic shock soon brought the serum into disfavour. An emulsion of bacilli was then used with some, but with less success. Later Ramon's discovery of diphtheria antitoxin gave a safe method of treatment which has given excellent results. The author's theory is that atrophic rhinitis is the result of a mild diphtheritic infection of the nose contracted some time previously. The diphtheria bacillus in time becomes the paradiaphtheritic bacillus of de Belfante and the devitalized tissues are infected by the numerous bacteria found in the established condition. He explains the greater incidence in the female by stating that the toxin of diphtheria at the time of original infection damages the endocrine glands, the female being more susceptible to endocrine dysfunction. Great benefit is claimed by treating these patients with antitoxin together with nasal hygiene and suitable gland therapy.

Deep X Ray and Radium Therapy in Relation to the Mouth and Upper Respiratory Tract.

W. L. WATT AND N. S. FINZE (*Journal of Laryngology and Otology*, March, 1928) discuss the treatment of tumours of the mouth and upper respiratory tract by deep X ray and radium applications. Deep X ray therapy acts by destroying the nuclear element of cells. There is always a general physical reaction to this treatment, primary or secondary according to the type of disease treated. The cells treated rapidly swell after treatment, then die and toxins of the necrotic cells are absorbed, causing slight fever, malaise, nausea and perhaps vomiting. The primary reaction occurs in a few hours, the secondary in two or three weeks. Deep X ray therapy was first used for pelvic growths and the situation of these is ideal for the maximum amount of benefit to be gained by this treatment. The factors of importance are the depth from the surface and the growth being entirely surrounded by tissues and fluids. The surrounding tissue also absorbs the rays, which inhibits extension. Further, the penetrating ray is reflected back on its course by

these tissues and it is believed that these reflected rays are the most powerful. In the larynx and oral cavity, on the other hand, the tumour is attached only by its base and is close to the body surface, so that the dosage must be cut down and the treatment cannot be so successful. Several methods of technique have been tried to overcome the natural defects of these areas, such as injection and electric medication, to increase the density of the body fluids and thus help secondary radiations; the external surfaces have also been covered with dense layers of various substances to get depth. Multiple treatment and altering the hardness of the rays at each treatment have also been advocated and at present seem to be the most satisfactory method. The authors believe that the necrosis and absorption of the dead cells cause the creation of antibodies in the blood which confer upon the patient an immunity for variable periods. The methods of treatment are varied. Radium can be used on the surface, buried in the growth in one quantity or inserted as many small doses by means of needles or seeds, the last mentioned technique giving gratifying results. Three methods of X ray exposure are in general use: (i) The original method of direct application over the surface which is being discarded owing to the impossibility of getting sufficient dosage without considerable damage to the skin, (ii) the glancing method and (iii) the six field method in which the whole neck is equally irradiated. Dosage is a much discussed question. Big doses for short periods or smaller doses for longer periods and subdivision of dosage are each advocated by different workers. The authors consider the dose must be determined for each individual patient and that combined treatment by buried radium and deep X rays gives the best results. The first treatment must be of adequate dosage, as the second treatment of the growth which has shown no reaction to the first, should not be attempted. Of the growths amenable to treatment sarcoma responds best to X rays, endothelioma to radium. Epithelioma resists X rays more than radium, but short wave length X rays are effective. Primary growth destruction is possible, but glandular involvement is very difficult to treat. The dangers of treatment are reactionary oedema of tissues necessitating tracheotomy in laryngeal conditions and the liability of septic processes to occur in the devitalized areas. A remote effect noted is the hardening of the skin over the area treated and this can go on to necrosis. It has been known to occur three years after treatment and can be brought about by direct trauma to the skin. The authors considered that in inoperable conditions radiation treatment will cause the disappearance of the primary lesion for a period up to five years, in 10% to 20% of cases; no other treatment can give such benefit. In operable conditions the percentage is higher, but it is not considered that

X ray treatment should be adopted as a routine. Every patient with malignant disease should have the advice of the surgeon and radiologist together. This team work is essential. The surgeons and radiologist must have a thorough knowledge of treatment in the various regions and be assisted by good pathologists and physicists.

Laryngectomy for Cancer of the Larynx.

LIONEL COLLEGE (*Journal of Laryngology and Otology*, March, 1927) chose as his subject for the Semen Lecture of 1927 "Laryngectomy for Laryngeal Cancer." This operation has been widely practised in recent years and performed frequently in unsuitable cases; as a result the mortality has been high. Cancer of the aryepiglottic folds, the epiglottis or postcricoid area should be treated by lateral pharyngotomy as the approach is easier and no good purpose is served by removal of the larynx. In cancer of the pyriform sinus laryngectomy is the only operation possible and although statistics vary, the author considers that when the operation is skilfully performed on properly selected patients, the mortality is now only 5%. This operation is also indicated in intrinsic cancer of the larynx when the growth involves a subglottic area, both sides of the larynx or if there is a recurrence after thyrofissure. The most important factor in coming to a decision regarding operation is the patient's general condition. Patients with asthenia, a history of prolonged dyspnoea or of alcoholic habits do very badly. Age in itself is no contraindication. The state of the teeth, tonsils and accessory sinuses is another important consideration; any septic lesion should be adequately dealt with two or three weeks before operation is undertaken. Preliminary tracheotomy is generally to be avoided, but, if performed, should be as low as possible. The epiglottis should always be removed and if necessary, the upper rings of the trachea to give a margin of safety. After-treatment is very important and careful nursing essential. The author considers objections of social, mental and physical disabilities raised against the ultimate results of the operation have been exaggerated. A pharyngeal whisper of varying intensity as a rule results and most patients find this adequate. There is no direct evidence that patients are more liable to pulmonary disorders and freedom of coryza has been noted. The author has seen no patients with melancholia as has been stated in the literature. The permanent tracheotomy tube and loss of laryngeal voice are two inevitable occurrences whether laryngectomy is performed or not. Finally, the operation in properly selected cases is justified by results and at present there is no other satisfactory treatment. Radium treatment is giving better results under improved technique. Treatment by X rays is of no avail and is dangerous.

Public Health.

VENEREAL DISEASES IN VICTORIA.

THE Victorian Branch of the Australian Association for Fighting Venereal Diseases has issued a pamphlet which will be included in the annual report. This pamphlet contains some statistical information from the United States of America and a memorandum by Dr. Charles H. Johnson, the Director of the Government Clinic for Venereal Diseases in Melbourne. It appears that during the last six years the average number of gonorrhoeal infections notified each year was 6,699 after correction has been made for women, while the figure for syphilis was 1,861 and for chancroid 219. This yields an annual average of all venereal diseases of 8,779. Dr. Johnson points out that the relative frequency works out at 2.8 gonorrhoeal infections in men and 0.77 in women to each syphilitic infection. He states that these figures are obviously incorrect, since the ratio of the two diseases in any given period must be approximately the same in the two sexes. He stated that the sexual life may be assumed to be from sixteen to fifty years and concludes that the amount of venereal disease can be measured by multiplying the average yearly number of notifications by thirty-five, that is 307,265. From the returns he finds that 95% of the infections occur in the metropolitan area, so that his estimate of the number of persons who have been infected in Melbourne alone is 291,901. This represents 32.4% of the population. Dr. W. A. T. Lind estimated the prevalence at 30%.

The Association for Fighting Venereal Diseases is dissatisfied with the results of notification and produces evidence to show that many infections are not notified. At the Venereal Diseases Clinic in Lonsdale Street approximately 2,500 persons are treated in the year. This figure represents more than a quarter of the total number of notifications. It is further pointed out that only 488 medical practitioners out of some fifteen hundred practising members of the profession have sent in notifications. From the information included in the pamphlet it would appear that notifications fail to a considerable extent because the medical profession as a whole does not obey the law and the authorities do not enforce it.

The authors of the pamphlet make two assertions. The first is that venereal diseases have diminished greatly in the armies and navies. This statement is probably true, but it is enunciated in such a manner that it would be impossible to prove or disprove. It is known that in certain sections of the British Navy and the Imperial Army during the war the incidence of gonorrhoea and syphilis was diminished, but it is significant that the authorities refused to promulgate the statistics of the British Army in regard to infections. In 1919 a considerable amount of invaluable information was recorded by medical practitioners who had devoted time and attention to this subject in Egypt and France. From these reports it appears that there was a very large amount of infection among the soldiers of the Australian Imperial Forces and among those of the British Army. It was stated that of those who availed themselves of prophylactic measures properly applied, only 5% contracted an infection. But the great majority either had no prophylactic treatment at all or applied it in an unsatisfactory manner. A loose statement like that in the pamphlet should be avoided, for accurate knowledge concerning the incidence of venereal diseases in all the navies and armies of the world in the past and at the present time is not available.

The second statement is even less acceptable. It is to the effect that venereal diseases have not been diminished appreciably among members of the civil population. Sir George Newman made a definite statement in his report published in 1922 that the efficient treatment of 80,000 persons suffering from syphilis, gonorrhoea or soft sore had had the effect of reducing the number of fresh infections to a noticeable extent. The Royal Commission on Health examined this question and in the report issued in 1925 it is stated that in Western Australia where the administration of the act is efficient, the effect of notification in reducing the incidence of infections is real and is not due to failure of notification. In other parts of the

Commonwealth the failure of notification and of treatment has been due to evasion of the law and insufficient provision of suitable clinics, especially for women.

The leaders of the Australian Association for Fighting Venereal Diseases devote a section of the pamphlet to the remedies. This part of the document is extraordinary and reflects enthusiasm and ardour rather than judgement and understanding. In the first place it is set forth that if all sexual relationships were limited to marriage, venereal diseases would soon be a thing of the past and that this implies early marriage. If the authors suggest that early marriage would result in the stamping out of venereal infections, they are very sanguine. Those who deal with these diseases in practice, are very frequently called upon by married people of both sexes to treat an infection acquired out of wedlock. The second statement is that while early and efficient treatment is of great value in reducing the amount of damage, it is costly and difficult. The authors hold the opinion that it is absurd to waste time, money and energy on something that should not exist. Unless early treatment is provided on a large scale the prospect of reducing the amount of infection will be bad indeed. The third proposition is that preventive measures applied soon after exposure to infection can be relied on to reduce the number of infections. This is true, as can be demonstrated in any city. The remedy suggested to combat this devastating set of diseases is the education of the public. To advocate this as a sovereign remedy is astounding. Many years ago an extensive inquiry was carried out in numerous universities in several countries in Europe to ascertain the incidence of venereal infections. The surprising fact elicited as a result of this inquiry was that the incidence was highest among medical students who may be presumed to be better aware of the risks of infection than others. Only the over-sanguine would believe that warnings and explanations will act as deterrents to young boys and girls and that risks do not add attraction to ventures. Moreover, all attempts that have been made to combat promiscuity have failed. A large amount of prostitution is due to the betrayal of girls by irresponsible men. The present age is one of licentiousness and indulgence in all forms seems to have taken a firm hold of the young members of the community. Those who hope to teach sexual physiology to the young without inducing *libido*, misjudge the trend of the day and the minds of children. It must further be recognized that reinfections are terribly common. If knowledge of sexual physiology and of the risks of infections were deterrent, surely those who had contracted gonorrhoea or syphilis, would avoid the danger of repeated damage.

Notification is an effective weapon if it is properly applied. Where it fails, the blame attaches to the authorities. It is useless unless exemplary punishment is inflicted on those who disobey the law. Notification must be followed up by compulsory treatment to be continued until the patients are no longer capable of conveying infection to others. Every one of the acts in the several States contains provision for penalties for discontinuance of treatment before time, for knowingly exposing others to infection, for treatment by others than medical practitioners and for failure to notify infections. In our opinion the strict enforcement of all the provisions of the venereal diseases acts and the establishment of prophylactic depôts and of treatment centres and of clinics on a large scale, with ample indoor accommodation for persons of both sexes would prove of far greater value in reducing the amount of infection than educational measures. The latter should be employed, even if it be recognized that they are unlikely to produce substantial results.

WESTERN AUSTRALIA.

AT intervals of two years a report is issued from the Public Health and Hospitals Department of Western Australia. On April 1, 1928, there arrived at the office of this journal a report covering the operations of the Department during the years 1925 and 1926. The document is signed by Dr. Everitt Atkinson, the Commissioner, and the date under his signature is December 15, 1927. On more than

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one occasion attention has been drawn in these pages to the delay which accompanies the publication of reports on the public health in several of the States of the Commonwealth. It is very important that a survey should be made from time to time of the activities of those bodies which are engaged in the practice of preventive medicine for the whole community. But when facts are revealed some sixteen months after the period with which they deal, they are shorn not only of much of their interest, but of a great deal of their value.

Financial.

The total expenditure of the combined department for 1925 was £203,534 and for 1926 £218,168. These figures represent successive increases of £18,570 and £14,634. These increases have been almost entirely due to additional expenditure on hospitals. Increased expenditure on hospitals has been possible owing to the fact that a special fund has been made available by means of the Entertainments Tax. It is claimed as a result of comparison with hospitals in the eastern States that the expenditure has been on an economical basis. This is, of course, an *ex parte* statement. No figures are given to substantiate it. Economy is always possible, but it is justified only if it is effected without loss of efficiency. It is not suggested that the subsidized hospitals in Western Australia are inefficient. Far from it. Western Australia labours under many disadvantages, not the least of which is its comparative isolation from other large centres of medical thought and practice. There is thus a danger that efforts to reduce expenditure may result in false economy. This is more possible in institutions which are financed by Government grants, for although the medical administrators may desire to establish new and necessary departments or to instal apparatus which has been proved by experience in other centres to be of value, they are more often than not compelled to submit their estimates to a pruning knife wielded for political reasons without reasonable discrimination. In regard to the amount of money spent it is interesting to note that the increase in population does not account solely for the increase in expenditure. In 1924 the population of Western Australia was 314,124 and the expenditure was £184,904. If the expenditure had risen in proportion to the increase in population, the amount spent in 1926 would have been something in the neighbourhood of £190,400. Actually the amount spent was £218,168.

Some interesting figures are given in connexion with the payment of fees by patients. In 1924 the fees of hospital patients (not the inmates of homes) amounted to £38,717 and in 1926 the amount was £44,410. The number of patients, however, has increased. In 1924 the number of patients treated in Government hospitals was 5,900 and in 1926, 7,359. The increase in the number of patients was 24.7%, while the increase in the amount provided by the patients was only 14.74%. The cost per patient per day was nine shillings and fourpence halfpenny in 1924 and nine shillings and tenpence in 1926. These figures at first sight seem quite satisfactory, but the percentage of revenue provided by the patients themselves to the cost has fallen slightly since 1924. In this year it was 45.1; in 1926 it was 45.04. The percentage has risen since 1921, when it was 35.3. In considering these figures it must be kept constantly in mind that the latest of them has reference to a period of time at least sixteen months ago.

Vital Statistics.

As already mentioned the population of the State in 1924 was 364,124. In 1925 it rose to 368,193 and in 1926 to 374,997. The birth rate per thousand of population was 23.1 in 1924, 22.2 in 1925 and 22.1 in 1926. It is pointed out that this fall in the birth rate is being continued in all the States of the Commonwealth and in the Dominion of New Zealand. In 1926 the birth rate was highest in Tasmania where it was 23.61%. Western Australia occupied fourth place and the birth rate was lowest in South Australia, 20.55%. The birth rate in New Zealand for this year was 21.05%. It is pointed out that the fall in death rates is less pronounced than that of birth rates. The death rate in 1926 was highest in New South Wales, 9.66%. It was lowest in South Australia, 8.73%. The New

Zealand rate was 8.74% and the Western Australian rate 8.9%. Satisfaction is expressed at the fact that the figures for Western Australia for 1926 are the best that have been experienced in the State. The still-births have been recorded amongst the deaths. It is regarded as certain that a large proportion of these will be prevented as knowledge regarding motherhood improves and is disseminated. The infant mortality was 55.7% in 1922, 56.2% in 1923, 49.9% in 1924, 56.8% in 1925 and 49.3% in 1926. A definite advance in infant welfare has been the establishment at King Edward Memorial Hospital of a new block of buildings containing wards for the carrying out of ante-natal treatment, as well as a ward for premature children. In addition an infant welfare centre has been established in the district of Subiaco. It is hoped that the special training of infant welfare nurses will be undertaken in the State and it is already possible to train midwives in modern methods of dealing with infants.

Infectious Diseases.

Enteric Fever.

The incidence of enteric fever has continued to decline. In 1923 the number of cases notified was 251 and the case mortality 7.1%; in 1924 the cases numbered 220 with a case mortality of 10%; in 1925 the figures were 223 and 6.3% and in 1926, 143 and 10%. The distribution of the disease throughout the State was without any apparent significance. No comments are made in regard to the improvements of methods for dealing with human excreta. At the same time, however, it is pointed out that there is a very satisfactory diminution in the incidence of the disease on the eastern goldfields.

Dysentery and Enteritis.

Nine cases of dysentery were notified in 1925 and 37 in 1926. The majority of the latter was notified from Claremont Asylum where infection with the Flexner organism continues to occur. Six persons were notified during the period as suffering from amebic dysentery and two of these apparently contracted the disease while on active service.

Diarrhoea and Enteritis.

Diarrhoea and enteritis in patients under two years of age are considered under a separate heading. The number of deaths which occurred during the four years 1923 to 1926, was respectively 143, 117, 138 and 96. The reduction in incidence is regarded as satisfactory. It is doubtful whether a reduction has occurred. It is not unlikely that there has been merely a temporary drop in the curve to be followed by a rise in the next year. The record for 1926 is the lowest so far recorded in the history of the State. It is pointed out at the same time that these conditions are preventable and that therefore the majority of the cases should not occur. According to the figures of the Government Statistician, 61% of the deaths from diseases of the digestive system during the period under review occurred among infants under one year in the metropolitan area. In this area only 42% of the total number of births occurred.

Scarlet Fever.

In the consideration of infectious diseases it is unwise to attach too much importance to a reduction in incidence over a short period. It is found that waves of infection occur at varying periods over long intervals of time. The Commissioner of Public Health anticipated in a previous report that an epidemic of scarlet fever would take place. His prophecy has come true. During 1922 the number of cases of scarlet fever notified was 96. During 1923 it was 62, during 1924 66, during 1925 123 and during 1926 225. He points out that the rate of spread appears to be low and that the infection as a rule is exceedingly mild. Only one death occurred during the period under review.

Measles.

During 1925 to 1926 no deaths occurred in Western Australia from measles. During 1924 the number of deaths was 38 or 1.2% of the total number of deaths in the State.

Pertussis.

Pertussis continues to be prevalent. During the period under review it was responsible for thirty-four deaths, fifteen during 1925 and nineteen during 1926. Thirty of these occurred in infants under two years of age. It is held that the majority of these should be prevented.

Diphtheria.

During the period under review there has been a diminution in the number of cases of diphtheria which have been notified. There has been a trough in the curve and the Commissioner regards this with some alarm. He points out that, while it is true that the careful swabbing of contacts which is customary in Western Australia, may have something to do with the relative absence of the disease, it is feared that the freedom is largely fortuitous and that in the meantime a large proportion of non-immune persons is being produced in the population and that this proportion may act as tinder to match, should the disease begin to make headway. It is extremely likely that this will occur and that the same increase will be found in diphtheria as was found during the period under review in scarlet fever. The Commissioner puts in a plea for the application of the Schick test and expresses the opinion that the members of the medical profession should be encouraged to familiarize themselves with the technique of performing the test and of immunizing susceptible persons and to urge upon the community the desirability of accepting this protection.

Tuberculosis.

In Western Australia pulmonary tuberculosis is notifiable, but other forms of tuberculosis are not. During 1925 403 cases of pulmonary tuberculosis were notified and during 1926 the number was 415. The number of deaths from this disease during these years was 259 and 252. These figures represent respectively 0·70 and 0·67 deaths per thousand of population and 7·8 and 7·5 of the percentage of total deaths. Other forms of tuberculosis during these two years accounted for seven deaths. Although the records for these two years reveal a slightly increased number of infections and of deaths, the tendency over a period of years is towards gradual diminution.

Venereal Disease.

The total number of notifications of venereal disease was 603 for 1925 and 788 for 1926. This increase of 185 cases in 1926 terminates for the time being the progressive decline which has been noticed for some years past. The increase has been almost entirely due to the greater incidence of gonorrhœa among males. There has also been a slight increase in the number of females affected by this disease. On the other hand the total number of cases of syphilis is somewhat less. Two excellent curves are given which depict the state of affairs with great clarity. This is a practice which might with advantage be adopted more often in the reports of other departments. In a table is shown in a striking way the difference which has occurred in recent years in the relationship of syphilis and gonorrhœa. In 1917 there were 3·4 cases of gonorrhœa to one of syphilis and in 1926 there were 11·4 cases of the former to one of the latter. In a graph the syphilitic infections have been analysed according to whether primary, secondary or tertiary lesions were notified. The fall has been greatest in the primary and secondary lesions. It is regarded as likely that whilst compulsory treatment in the case of syphilis has had the effect of reducing the incidence of the disease, no such effect has been noticed in regard to gonorrhœa. The Commissioner thinks that this is to be expected, for medical practitioners in touch with the treatment of both diseases, testify to the immediate results obtained by modern treatment in syphilis as compared with the frequently long drawn out infectivity of gonorrhœa in spite of treatment, especially in females. Moreover he sees in the figures which he gives, reason for encouragement. The maintenance of the notification of considerable numbers of gonorrhœal infections suggests that there is no falling off in the allegiance to the notification provisions of the Act which might be claimed as reason for the apparent disappearance of syphilis. Western Australia was the first State to

inaugurate legislation for the compulsory notification of venereal disease, in fact she set an example to other countries in this regard. There is thus encouragement to be gathered from the report of the Commissioner as far as venereal diseases are concerned.

Other Matters.

Among other matters considered in the report are the doings of the officer in charge of the bacteriological laboratory. Little that is of any use can be gathered from an account of the number of tests that have been carried out as a routine in the examination of blood, sputum, urine and so forth. If an analysis were made of the different methods and comparison of results obtained, this part of the report would be valuable. It is noted that in the next report information may be expected in regard to the examinations and work done by the school dental officer appointed at the end of 1926. By the time this reaches the medical profession, it will be almost ancient history, but as there seems to be no remedy for the tardy appearance of these reports, medical practitioners interested in preventive medicine will have to be contented with the reflection that it is better to get late information than not to get it at all.

THE HEALTH ORGANIZATION OF THE LEAGUE OF NATIONS.

THE annual report of the Health Organization of the League of Nations is a lengthy document divided into six chapters. The matters dealt with and the details included give an indication of the various activities of the several committees of the League during the year 1927. Much of the subject matter is descriptive of the procedure followed and as such cannot be usefully reproduced in these columns. The part played by the Rockefeller Foundation in the development of the work may be measured by the size of its contribution to the year's budget. The total expenditure of the Health Organization in 1926 was 1,453,843 Swiss francs, of which 656,365 francs was the amount of the Rockefeller Foundation grant.

Epidemiological Information.

The Health Committee has entered into an arrangement of the Permanent Committee of *l'Office International d'Hygiène Publique* whereby the work of the two bodies will be coordinated in future. This work deals chiefly with the broadcasting of epidemiologic information to all countries. An important development consists in the establishment of the Eastern Bureau of the Health Organization at Singapore. Much detailed information is given concerning the manner in which the new bureau fulfils its functions. An innovation has been introduced by the increasing use of wireless communications from Singapore and from other countries to Singapore. The cost of transmission is materially reduced and the frequency of the messages has been increased. An advisory council has been established in connexion with the Eastern Bureau and this council met twice in 1927, once at Singapore and once at Delhi. At the latter meeting Australia was represented by Dr. A. H. Baldwin, of the Institute of Tropical Medicine, Townsville. The council has adopted a constitution and is now a well established body. Reference is also made to the International Pacific Health Conference which was summoned by the Department of Health of the Commonwealth and met in Melbourne in December, 1926. It was decided to establish an Austral-Pacific zone, with Melbourne as its centre. This service is to be supplementary to the Eastern Bureau at Singapore and will not replace the work conducted at the bureau. Much interesting information concerning the organization of statistical services in the various countries of the world is included in the report. There seems to be still a great deal of difficulty in the adoption of a uniform nomenclature and list of diseases.

Infant Mortality.

The second conference of experts on infant welfare was held in Paris in January, 1927. A full account is given

of the preliminary work and of the steps taken to obtain uniformity in the information presented. Inquiry was carried out in twenty-nine districts in seven countries to ascertain the actual causes of deaths of infants. It appears that there is a very large variation in the infantile mortality both in urban and in rural districts and further that the ratio of still-births to the total population varies very widely. The third conference was held in Vienna in September, 1927, and a report was issued. While certain tentative conclusions have been reached, regret was expressed that a standard list of causes of still-birth has not yet been adopted. It is held that prematurity and still-birth form the chief causes of death, but since it is impossible to ascribe still-birth to its causes, further inquiry becomes essential. This work is to be extended to the Argentine, Brazil, Chile, Paraguay and Uruguay.

International Cooperation.

The endeavour to establish an active coordination of the health departments of different countries has been developed considerably during the year 1927. The chief means of effecting the liaison has been the interchange of public health officials and the holding of courses of lectures to visiting officials in advanced public health and hygiene. Courses were held in Paris and in London. In addition individual missions have been arranged whereby members of the public health administrations of certain countries have been given opportunities to visit distant centres for study.

Malaria Prevention.

The Malaria Commission has issued a valuable report which cannot be summarized in a few words. The following chapters indicate the scope of the inquiry: declaration of malarious zones, the use of mortality statistics, sampling (spleen and parasite rates), notification, discovery of patients by house to house visits, measurement of malaria in mosquitoes. Special investigations are to be conducted in Bulgaria. The Health Organization recognizes the valuable work undertaken by the Rockefeller Foundation in the problem of malaria prevention.

Other Commissions.

The Sleeping Sickness Commission completed its work in 1927. A full report will be issued of the work of this organization. The Opium Commission has apparently done much good work. The Cancer Commission has issued a report in the course of which certain conclusions have been reached. The claim is made that there is a definite relationship between fertility and cancer of the breast and between parturition and cancer of the cervix. Other aetiological factors have been established. It is further stated that the frequency of resort to operation is deplorably low and that early operation has been proved to be much more successful than the general body of the medical profession supposed. The causes of death given on death certificates is held to be unsatisfactory. In all countries in which inquiry was instituted, this unsatisfactory state of affairs exists. Some suggestions concerning promising methods of investigation in the cancer problem are made.

Information concerning the work of the Permanent Standards Commission, the Small Pox and Vaccination Commission and the Commission on Education in Hygiene and Preventive Medicine is also given.

Post-Graduate Work.

POST-GRADUATE COURSE IN BRISBANE.

THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged to hold a post-graduate course in medicine from July 30 to August 3, 1928. The fee for attendance will be two guineas. Applications for enrolment should be made at an early date to the Joint Honorary

Secretaries, Dr. S. F. McDonald and Dr. Neville G. Sutton. It is pointed out that space in the different operating theatres is strictly limited and that admission will be permitted only on presentation of a ticket of membership.

As the Brisbane Exhibition will be held early in August, members attending the course are advised to make early application for accommodation. A dance and bridge party will be held at the National Hotel Roof Garden on Monday, July 30, at 8.30 o'clock p.m. The annual dinner of the Queensland Branch will be held on the evening of Thursday, August 2.

The following programme has been arranged:

Monday, July 30, 1928.

At 3.30 p.m.—Lecture by Dr. Eustace Russell at the Brisbane Hospital, entitled: "Diabetes and Pernicious Anæmia."

Tuesday, July 31, 1928.

Morning.—Surgical Operations at the Brisbane Hospital by Mr. H. B. Devine.

At 3 p.m.—Lecture and Demonstration by Dr. H. Douglas Stephens at the Hospital for Sick Children, Brisbane, on "Hernia and Limp."

At 8.15 p.m.—Lecture by Mr. H. B. Devine at the Geology Theatre, University of Queensland, entitled "Abdominal Diagnosis."

Wednesday, August 1, 1928.

At 3 p.m.—Lecture by Dr. H. Douglas Stephens at the Hospital for Sick Children, Brisbane, entitled: "Surgical Emergencies of Childhood."

At 8.15 p.m.—Lecture by Mr. H. B. Devine at the Geology Theatre, University of Queensland, on "Abdominal Diagnosis."

Thursday, August 2, 1928.

Morning.—Surgical Operations by Mr. H. B. Devine at the Mater Misericordiae Public Hospital.

Friday, August 3, 1928.

At 3 p.m.—Lecture by Dr. H. Douglas Stephens at the Hospital for Sick Children, Brisbane, on "Medical Difficulties in Childhood."

Professor W. Colin MacKenzie will deliver the Bancroft Memorial Lecture at the Geology Theatre, University of Queensland, on Friday, August 3, 1928, at 8.15 p.m. The subject of the lecture will be "Functional Anatomy and Medical Practice" and it will be illustrated by still and moving pictures.

Mr. H. B. Devine will deliver a special College of Surgeons of Australasia lecture on the afternoon of Thursday, August 2, 1928.

POST-GRADUATE WORK IN MELBOURNE.

REFERENCE has been made in this journal (February 11 and March 24, 1928) to the modification of the usual plan of refresher courses of study in Melbourne. Arrangements have been made with Professor F. R. Fraser, of Saint Bartholomew's Hospital, London, to deliver a series of six post-graduate lectures in August. The Melbourne Permanent Committee for Post-Graduate Work has determined to concentrate on this work during the month of August and has fixed the period from Monday, August 6, to Friday, August 17, inclusive, for the annual refresher course instead of holding it in November. The course will thus coincide with the visit of Professor Fraser and those who can free themselves for the purpose, will be enabled to take advantage of post-graduate study of exceptional didactic merit. The refresher course will be planned as heretofore and it is anticipated that the same success that has attended the courses in previous years, will be

maintained and perhaps exceeded in August. The full programme will be published in due course. The fee for the refresher course is three guineas. Full particulars can be obtained by applying to the Joint Honorary Secretaries, Dr. J. W. Dunbar Hooper and Dr. H. R. Dew, 12, Collins Street, Melbourne.

A course in obstetrics will be held in November, 1928, instead of in August as was announced. This course will be held at the Women's Hospital. Further particulars will be published in due course.

The course of six lectures by Professor F. R. Fraser will be delivered at the Medical Society Hall, East Melbourne, at 8.30 p.m. on the dates given below.

Tuesday, August 7, 1928.—"Causes of Dyspnoea and the Clinical Types."

Wednesday, August 8, 1928.—"Cardiac Dyspnoea."

Friday, August 10, 1928.—"The Therapeutic Uses of Digitalis."

Monday, August 13, 1928.—"Diuresis."

Wednesday, August 15, 1928.—"Heart Failure in Graves's Disease."

Friday, August 17, 1928.—"Haematemesis and Its Management."

Members wishing to attend the course should lose no time in sending in their applications to the Joint Honorary Secretaries. The fee for the course will be announced in an early issue. The importance of these lectures need not be emphasized. The reputation of the lecturer and excellence of his choice of subjects will attract practitioners from all parts of the Commonwealth.

Obituary.

HAROLD EDGAR FEATHERSTONE.

AFTER an illness of some months during which he carried on his duties as Senior Medical Officer of the Department of Repatriation in Victoria almost to the last day, Doctor Harold Edgar Featherstone passed away at his residence, Kooyong Road, Caulfield, Victoria, on April 13, 1928, at the age of fifty-four.

Harold Edgar Featherstone was a son of the late Benjamin Featherstone, of Adelaide, and grandson of Michael Featherstone, of Brighton House, Brighton, South Australia, who was one of the early pioneers of that State, landing in 1836, before its establishment.

In his boyhood Harold Edgar Featherstone was taken to England and was educated at King's College, London. He qualified as a civil engineer and was Borough Surveyor of Chesterfield, England, at the age of twenty-one. Tiring of the restrictions attaching to this profession, he relinquished it and entered Durham University Medical School, where he had a successful and uninterrupted course as a student. On qualification he held various resident house appointments at his hospital and later entered private practice at Walton-the-Hill, England. In 1911 he returned to Australia accompanied by his wife and settled on his property, the Lake Vineyard, Rutherford, Victoria, which he developed in company with his brothers until the outbreak of war, shortly after which he enlisted and saw active service as a Captain of the Australian Army Medical Corps on a hospital ship. Returning to Australia he joined the staff of No. 5 Australian General Hospital, St. Kilda Road, Melbourne, and later was Officer-in-Charge of the Repatriation Hospital at Caulfield for some years. He was then appointed Senior Medical Officer in the Repatriation Department in Victoria. This office he held with distinction and, although stricken with a rapidly progressing and fatal illness, he remained at his post almost to the end. In his professional and departmental capacities Harold Edgar Featherstone earned and richly deserved the love and respect of all his friends and colleagues and the trust and gratitude of innumerable returned soldier patients who passed through his hands and who found that here they received what they called "a fair deal." Those who knew him best, knew that this reputation was not acquired easily, but was won by a persistent humanity,

scarcely concealed by his air of worldliness and by a self-sacrificing devotion to duty and to the service of his fellows which did not relax even in the face of death.

Dr. H. M. James, Medical Superintendent of the Repatriation Sanatorium, Mont Park, Victoria, writes:

By the death of Harold Edgar Featherstone on April 13 at a comparatively early age was removed one of the outstanding figures of post-war administration. It was my privilege to have been closely associated with him during the past ten or eleven years in the treatment of the ex-soldier in his many and varied phases and the task of finding another man as perfectly fitted for the duties he carried out so efficiently and sympathetically as Senior Medical Officer for the Department of Repatriation in Victoria will be a difficult one.

Before his illness, a man of splendid physique and striking personality, he combined remarkable administrative ability with sound medical science and an unfailing sense of proportion. With this rare combination a delicate and ever present sense of humour made his personality one unlikely to be forgotten by those fortunate enough to have been his associates. Widely read, his store of general knowledge was inexhaustible and his contribution to any discussion merited the respect with which it was received. His well balanced and mature judgement provided an unquestioned asset to the Department in whose services the latter years of his life were spent.

It will be the personal side of the man that will live even when his executive ability is forgotten. Loyal to his staff, he commanded the respect and affection of all. His helping hand was ever ready whether to the clerk in difficulties or to the digger in disgrace. To the cares of his office he added many a burden from a troubled soldier or an inexperienced employee. His careful consideration and broadminded advice were available for one and all. In giving he gave of his best. The double line row of bare-headed diggers at his funeral was mute evidence of the regard in which he was held. Every soldier organization was represented by floral offerings and the feeling was manifest that here had passed a friend.

A man of quiet tastes, his family, his garden and his books engrossed his few leisure hours. His sole recreation was bowls at which he excelled, and his cheery presence on the green was guarantee that the game would be good.

So passed a man unselfish, capable and humane. His early loss must be ever regretted.

THOMAS MORGAN MARTIN.

IT is with great regret that we have to announce the death of Dr. Thomas Morgan Martin which took place in Sydney on May 23, 1928.

Corrigendum.

READERS are referred to an article entitled "Generalized Infections due to *Pseudomonas aeruginosa* (*Bacillus pyocyanus*) with a Study of the Characteristics of Local Strains of the Organism," by Dr. A. B. Lilley and Mr. A. J. Bearup, published in THE MEDICAL JOURNAL OF AUSTRALIA of March 24, 1928, and are asked to embody the following corrections in the text.

On page 365, left hand column, under "Case 2," instead of "(see table)" read "(see Table V)." In the right hand column, under "Case 4," in the second and fourth paragraphs instead of "seen in smears" read "recovered in culture." Under the same case, read "May" instead of "April" in the four situations where it occurs. In the fifth paragraph "small leucocytes" should read "small lymphocytes." Under "Case 5," eleventh line from the bottom of the column read "January" instead of "July."

On page 366 under "Case 6," in line 40, left hand column, instead of "1928" read "1926."

On page 367, left hand column, last line, add "(see Table III)." On page 369, right hand column, eighth paragraph, read:

Four cases (Nos. 6-9) have been briefly described. In all of these the laboratory tests for the typhoid group of organisms did not yield evidence of infection by the typhoid group.

On page 370, in Table IV, under Case 4, the blood organisms liquefied gelatine and produced pigment. Add the following words to the explanatory footnote attached to Table IV: "In broth there was a distinct turbidity with thick pellicle formation and heavy sediment."

On page 372, reference ⁽⁶⁾ should read:

"H. Lartigau: *Journal of Experimental Medicine*, 1898. Volume III, page 595, cited by Waite."

Correspondence.

THEFT OF INSTRUMENTS AND BOOKS.

SIR: Last November a large box containing about £80 worth of instruments and also medical books were sent to me from Melbourne to Newcastle, where they were left in store until about a month ago and then sent on to me to Sydney. I opened the box just before leaving for Thursday Island and found that most of the instruments were missing. The box was not insured and the instruments were stolen either in Melbourne, Sydney or Newcastle, so that I can make no claims. It occurred to me that perhaps medical men might be helpful in advising me about these instruments and I would be grateful of your assistance if you would kindly place some notice in a prominent manner in THE MEDICAL JOURNAL OF AUSTRALIA regarding the matter. The instruments were mainly of the small kind—needle holders, scissors, forceps, ear, nasal and vaginal specula, pelvimeter, quinsy forceps *et cetera*.

Thanking you and my medical colleagues in anticipation.

Yours, etc.,

J. SCHWARTZ BARR-DAVID.

Thursday Island.
May 10, 1928.

AMERICAN ETHICS.

SIR: A correspondent in today's journal shows plainly how old prejudices die hard and especially in Australia, probably by its remoteness from the medical centres. Again we read the old fairy stories of medical practice and ethics in the United States of America. Let me first state that the medical laws of America are the most stringent and the county medical societies the most active in the world; these bodies control with a rod of iron every practitioner within its State.

The day of do as you please has long passed in the United States of America, but still fondly remembered in Australia. The sooner the medical bodies of Australia adopt American ethics the better. This would end all unqualified practice, 30 x 30 name-plates and the usual batch of straight-out and oblique week-end advertisements.

Yours, etc.,

"A.M.A."

Sydney.
May 21, 1928.

THE TREATMENT OF PARALYSIS AGITANS.

SIR: I note that on page 631 of this week's issue "Country Practitioner" asks for suggestions for treating *paralysis agitans*.

My father had a patient who had suffered for many years with well marked *paralysis agitans*. Several times, when he was almost *in extremis*, the exhibition of morphia in regular doses was attended with such extraordinary improvement that that patient was put on a regular allowance. He put on weight and his tremors became imperceptible and, except for his mask face, he was in perfectly normal health for over five years, but relapsed whenever the treatment was discontinued. He was still alive when

I heard of him last. I examined him in a relapse and during treatment and often saw him about the town.

I have used the same treatment with marked benefit in several patients, but although the results are in my mind better than with the hyoscine treatment or any other treatment, I would not use it unless the hyoscine treatment had failed, owing to the risk of establishing the habit, though so far I have not seen a case where any craving for the morphia resulted. The drug is given by mouth.

Hoping this information may be of assistance.

Yours, etc.,

A. B. K. WATKINS,
M.S. (London), F.R.C.S. (England).

Commercial Bank Chambers,
Bolton Street, Newcastle,
New South Wales.

May 21, 1928.

Naval and Military.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazettes*, Numbers 46 and 48, of May 17 and 24, 1928.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH. (SEA-GOING FORCES.)

Loan to Royal Navy for Service and Training.

The loan of the following Officer to the Royal Navy for Service and Training is terminated:—Surgeon-Commander Alexander Scott Mackenzie.

AUSTRALIAN MILITARY FORCES.

First Military District.

Cavalry: 14th Light Horse.

Major A. H. Powell, D.S.O., is transferred (provisionally) from the Australian Army Medical Corps, 18th April, 1928.

Second Military District.

Australian Army Medical Corps.

The appointment of Major A. C. Arnold to command the 1st Field Ambulance is extended for a period of one year from 1st July, 1928.

The provisional appointment of Lieutenant F. G. Roberts is terminated, 14th April, 1928. To be Lieutenant (provisionally).—Frederick Gregory Roberts, 15th April, 1928.

Australian Army Medical Corps Reserve.

Major T. R. E. Davis is placed upon the Retired List with permission to retain his rank and wear the prescribed uniform, 15th May, 1928. The undermentioned officers are retired:—Majors F. Mackay, C. M. Samson, M.C., and E. M. Ramsden; Captains F. E. Dawson, R. C. Dent, R. A. Bull, A. C. Smith, W. R. Thrower and F. Boothroyd; Honorary Captains L. B. H. Conroy and W. Sproule and Lieutenants P. A. Ryan and E. G. Jones, 17th May, 1928.

Third Military District.

Australian Army Medical Corps.

The provisional appointments of Captains W. L. Carrington and S. A. McKenzie are confirmed.

Award of the Colonial Auxiliary Forces Officers' Decoration, Australian Army Medical Corps.—Captain H. S. Jacobs.

Fourth Military District.

Australian Army Medical Corps.

Major L. O. Betts, O.B.E., ceases to be seconded 29th February, 1928, and he is transferred to the Australian Army Medical Corps Reserve with the rank of Major (Honorary Lieutenant-Colonel), 1st March, 1928.

Fifth Military District.*13th Mixed Brigade: Staff.*

Major L. A. Hayward, Australian Army Medical Corps, is appointed (temporarily) Deputy Assistant Director of Medical Services, during the absence on leave of Major C. Morlet, D.S.O., 10th April, 1928.

Australian Army Medical Corps.

Major L. A. Hayward is appointed from the Australian Army Medical Corps Reserve, 10th April, 1928; the provisional appointment of Captain L. G. Male is terminated, 13th April, 1928. To be Captain (provisionally)—Honorary Captain L. G. Male, from the Australian Army Medical Corps Reserve, 14th April, 1928.

Books Received.

DIABETES, ITS TREATMENT BY INSULIN AND DIET: A HANDBOOK FOR THE PATIENT. by Orlando H. Petty, A.M., M.D., F.A.C.P.; Fourth Revised and Enlarged Edition, 1928. Philadelphia: F. A. Davis Company. Post 8vo., pp. 155. Price: \$2.00 net.

PRACTICAL DIETETICS FOR ADULTS AND CHILDREN IN HEALTH AND DISEASE. by Sanford Blum, A.B., M.S., M.D.; Third Revised and Enlarged Edition; 1928. Philadelphia: F. A. Davis Company. Royal 8vo., pp. 390. Price: \$4.00 net.

Diary for the Month.

JUNE 5.—Tasmanian Branch, B.M.A.: Council.
JUNE 6.—Victorian Branch, B.M.A.: Branch.
JUNE 6.—Western Australian Branch: Council.
JUNE 6.—South Sydney Medical Association, New South Wales.
JUNE 7.—South Australian Branch, B.M.A.: Council.
JUNE 8.—Queensland Branch, B.M.A.: Council.
JUNE 12.—Tasmanian Branch, B.M.A.: Branch.
JUNE 12.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 14.—Victorian Branch, B.M.A.: Council.
JUNE 14.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 18.—New South Wales Branch, B.M.A.: Organization and Science Committee.
JUNE 19.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments.

Dr. William Carrick Tunk Upton (B.M.A.) has been appointed Honorary Visiting Dermatologist to the "Mareeba" Babies' Hospital, South Australia.

Dr. James Edward Fancourt McDonald (B.M.A.) has been appointed Visiting Medical Officer, Epileptic Home, Willowburn, Queensland, as from July 10, 1928.

Dr. James Edward Fancourt McDonald (B.M.A.) has been appointed Medical Superintendent, Hospital for the Insane, Toowoomba, Queensland, as from July 10, 1928.

Dr. James Gray (B.M.A.) has been appointed Government Medical Officer at Quirindi, New South Wales.

Dr. Horace Rowland Guest Barrett (B.M.A.) has been appointed Assistant Medical Superintendent, Hospital for the Insane, Toowoomba, Queensland.

Dr. John Henry Sandford Jackson (B.M.A.) has been appointed Visiting Medical Officer to the Woorabinda Aboriginal Settlement, Queensland.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

MARRICKVILLE DISTRICT HOSPITAL, SYDNEY: Honorary Vacancies.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Medical Superintendent.

THE UNIVERSITY OF SYDNEY: Walter and Eliza Hall Fellowship in Medicine.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30-34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booreroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of **THE MEDICAL JOURNAL OF AUSTRALIA**, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to **THE MEDICAL JOURNAL OF AUSTRALIA** alone, unless the contrary be stated.

All communications should be addressed to "The Editor," **THE MEDICAL JOURNAL OF AUSTRALIA**, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2551-2.)

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